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Contractors and Engineers Monthly

Vol. 44, No. 10 · OCTOBER, 1947 · $3 a Year, 25 Cents a Copy

OCT 22 1947

Covering the Field

• Producing Crushed Rock
In a pit of hard abrasive limestone, it took new modern equipment to crush rock for road building. See this page.

• Paving Airport Runway
Heads-up contracting described on this page turns in record concrete-runway paving footages at a midwest airport.

• Bridge Construction
An all-welded steel lift bridge on concrete piles replaces an old floating barge across a waterway (page 1).

• Big Concrete Dam
The page 2 story of Allatoona Dam covers access-road and cofferdam work, excavation, and cableway concreting.

• Bituminous Paving
Page 5 tells of a contract to place 4 inches of asphaltic concrete.
Black-top, blended in a continuous-mix plant, is laid for 19 miles (page 54).

• Safety on Road Jobs
How a contractor kept traffic moving safely through his job on "the world's busiest highway" is described on page 16.

• Portrait in Print
A veteran superintendent, an ex-baseball pitcher, has a word to say on page 22 about job safety yesterday and today.

• Highway Grading
Fourteen days of rain hit this 9.6-mile job in five weeks (page 26).
Railroad tracks lay 300 feet below this rock-excavation job. See page 71.

• Mile-Long Outfall Sewer
A trestle and cofferdam are built, concrete pipes and footings poured—despite the mighty Pacific (page 34).

• County Road Work
Local deposits of rock-asphalt help a county short of funds improve its 1,500-mile system. See page 40.

• Highway Maintenance
State forces lay a 5.6-mile stone base course and give it a bituminous cover coat. The story appears on page 45.

• New River Lock
For a picture story of concrete guide-wall construction on a new Mississippi River lock, turn to pages 48-49.

• Canal Construction
Dragline excavation of clay and a mobile concreting unit for structure pours feature an irrigation-canal job, page 59.

• Concrete Paving
Some 8.87 miles of concrete paving complete a highway project begun before the war. The article appears on page 77.

• Equipment Shop
There's an account on page 88 of a modern shop at district headquarters which repairs heavy maintenance equipment.

• Trees on the Roadside
New York's program of handling roadside vegetation is presented on page 90.
(You will find "In This Issue" on page 4)

C. & E. M. Photo
Young John Mendenhall starts early to learn the game, as he spends his summer vacation with his dad, V. C. Mendenhall, on his highway job in Utah.

Modern Crusher Licks Tough Pit

30,000 Tons of Crushed Rock Are Manufactured For PRA Road Job in Hard Abrasive Limestone

✦ ABOUT 80 miles east of Salt Lake City, in Uinta National Forest, V. C. Mendenhall of Springville, Utah, recently demonstrated the value of new equipment on a tough job. In a native pit of excellent rock so hard that two contractors were forced several years ago to move out after they set up their equipment, Mendenhall successfully produced about 30,000 tons of crushed stone for road building.

The deposit is classed by many highway engineers and contractors as "one of the toughest pits in Utah". Fully 90 per cent of the material must be crushed. The rock, a hard abrasive limestone, is so sound it has torn up equipment. The pit fairly drips water,

(Continued on page 30)

New Concrete Runway Is Speeded at Airport

Fast-Working Crews Team Up With Good Equipment Scheme; Grade and Pave New Runway at Fast Rate

✦ PUSHING ahead rapidly between spring rains, heads-up contracting is responsible for laying 12-inch plain-concrete runway strips 25 feet wide at the rate of 930 feet in 9 working hours. The job is at Lambert-St. Louis Municipal Airport. Under a contract which totals approximately $1,000,000, Fred Weber, Contractor, Inc., is building 5,100 feet of the new east-west runway for the City of St. Louis.

Not once, but several days, Weber's men and machines have turned in paving footages in excess of 900 linear feet. The secret is good organization, new equipment, and an accessible job.

Lambert-St. Louis Municipal Airport is one of the most important in the midwest. Heavy, fast, transcontinental airliners use it to pick up and unload commercial passengers. A Naval Reserve unit flies military aircraft from Lambert Field. And in addition there are a hundred or more unscheduled flights in and out each day. The Weber contract is another link in the construction chain which one day soon will make this field enormous.

The new east-west runway now under contract will be 9,000 feet long in the ultimate development; new ground is being held in reserve to add to the field. Drainage work done last construction season to train Coldwater Creek through a covered box under the new runway, has largely solved the flood problem.

Weber's contract calls for the construction of 5,100 linear feet of 200-foot concrete runway, several taxiways, and miscellaneous tie-ins with existing ground facilities. Funds for this new development are being supplied by the City of St. Louis, which has long been one of the most air-minded cities in the country. As a matter of fact, Lambert Field is named for one of Charles A. Lindbergh's early financial backers.

Finished runways will have a flat 15-inch drop from the center line to each side, and all earth slopes in cuts will be graded down to 30 to 1 for good clearance. Started December 14, 1946, the job is expected to be completed by November 1 of this year. About 400 working days from December 14 last year will be allowed, but when the job was visited Weber hoped to finish ahead of schedule if everything went well.

Dirt Flew on Grading

In order to clear the east end of the runway, about 6,300 feet of embankment was set up. This involved the excavation and haul of 550,000 cubic yards of earth. The soil is mostly a sandy silt, with some clay strata present. It gets slick and muddy in a rain, but dries readily under the action of sun and wind.

Three Caterpillar DW10's, each towing a LaPlant-Choate earth-moving scraper, were brought in for long-haul work. A Super C Tournapull was used also for some of the long hauls. The new LaPlant-Choate prime mover, demonstrated at Dubuque, Iowa, Ardmore, Okla., and the east, was used here also. Two Caterpillar D8 tractors with LeTourneau Model LP Carryalls handled the shorter hauls.

This earth-moving fleet was filled out by an Adams 512 and a Caterpillar No. 12 motor grader, a tandem sheepsfoot roller pulled by a D7, and a D8 pusher tractor.

Grading equipment had scarcely broken through the ground crust be-

(Continued on page 18)

New Welded-Steel Bridge Is Erected Over Waterway

Lift Span to Replace Old Floating Barge Rests on Concrete-Pile Foundation; Tall Crane Erects Tower

✦ FOR the past 15 years, an old floating barge has served as a bridge carrying highway traffic on Florida's State Route 71 across the Intracoastal Waterway. Now, however, a modern steel lift span, designed for H-15 loading and supported on concrete piles and piers, has been constructed in its stead. Cleary Brothers Construction Co. of West Palm Beach, Fla., was awarded the contract on its low bid of $289,202.81 by the Florida State Road Department. Work on the project got under way in May, 1946, and the new all-welded structure at White City in western Florida was opened to traffic in May of this year.

At this point, about 7 miles north of Port St. Joe on the Gulf of Mexico, the 12-foot channel of the Intracoastal Waterway is about 125 feet wide, but fender piling had reduced the navigable width to the size of a standard wooden barge. This barge, fitting within the opposite rows of wooden piling, pivoted at one end and swung open at the other by means of a 2-drum winch, with cable lines above and below the makeshift bridge. Located at about the center of a mile straightaway in the channel, the barge was swung open as water traffic approached. Wooden aprons running up to both shores were first raised a foot, the barge was moved parallel to the

(Continued on page 11)

C. & E. M. Photo
A lift-span counterweight sheave cover and a structural-steel worker are swung to the top of the south tower during construction of a new vertical-lift highway bridge over the Intracoastal Waterway in Florida.

OCT 23 1947

Concrete Dam Rising Inside Big Cofferdam

Access Roads, Preliminary Work, Excavation Are Completed for Flood-Control Hydroelectric Project

By WILLIAM H. QUIRK,
Eastern Editor

✦ AFTER a year of essential preliminary work, concrete placement in the huge Allatoona Dam at Cartersville, Ga., got under way in May. The 1,250-foot-long gravity structure is being built by National Constructors, Inc., under a $13,282,088 contract with the Corps of Engineers, under supervision of the District Engineer, Mobile, Ala. The contracting firm, which was organized for this particular job, is owned and operated by the Arundel Corp. of Baltimore, Md.; the L. E. Dixon Co. of Los Angeles, Calif.; and the Hardaway Contracting Co. of Columbus, Ga. The office for this job is at the dam site near Cartersville.

The dam is located on the Etowah River, about 35 miles northwest of Atlanta, Ga. Its construction is authorized by the Flood Control Act of 1941; it is considered a combined flood-control-hydroelectric development. The project is scheduled for completion in August, 1949.

At the dam site, the Etowah River flows nearly due west to empty into the Coosa River, a tributary of the Alabama River. A cellular steel-pile cofferdam has diverted the stream flow to a confined channel along the right or north bank, in order that the south half of the structure may be built. When this half is completed, a similar cofferdam will be built on the other side of the river so that the north half of the dam may be concreted. The river will then be diverted both through sluiceways in the finished section, and through a passage created by leaving one monolith low.

Concrete is mixed in a plant located on a hill at the top of the north abutment, and delivered to the forms by means of a cableway system having a 1,710-foot span. (See companion article.)

Features of the New Dam

The Allatoona Dam is a gravity-type concrete structure with a vertical face on the upstream side. But its 1,250-foot length is arched to fit the abutments on each shore. In plan view from the north abutment, the dam consists of a tangent, five arcs with radii of 1,000, 1,400, 2,000, 1,400, and 1,000, and another tangent at the south abutment.

The overflow section, 520 feet wide, will have a spillway crest at elevation 835.0, with a net spillway length of 400 feet; it will be about 145 feet above the streambed. The non-overflow section will be at elevation 880.0, about 190 feet above the bed of the river. For the upper 35 feet the dam will be 19 feet thick, while at the base the thickest part will measure about 166 feet. An 18-foot road will cross the top of the dam.

At flood-pool level, elevation 860, the lake area will contain 20,300 acres, and will have a maximum depth of 165 feet. Water will be backed up the river to near Canton, creating a shore line of about 500 miles.

The dam will reduce flood heights at Rome, Ga., located at the confluence of the Etowah and Oostanaula Rivers; it will alleviate floods along the lower reaches of the Etowah River; and it will store water for conversion into electrical energy. The initial installation in the 248 x 114-foot powerhouse will consist of two large turbines passing about 3,650 cfs each, to turn two

(*Continued on page* 66)

Looking from the north abutment of Allatoona Dam site, we see benching of the south abutment and the sheet-pile cofferdam from the left bank of the Etowah River.

C. & E. M. Photo

Hilltop Mixing Plant and Cableway System Deliver Concrete to 1,250-Foot Structure in Georgia

✦ ALL the aggregate, both coarse and fine, for the 517,450 cubic yards of concrete in Allatoona Dam is being produced at a dolomitic limestone quarry. It was discovered beneath meadow land about 11 miles north of Cartersville. A subcontract for supplying the aggregate was given to the two firms of Lambert Bros., Inc., of Knoxville, Tenn., and Kershaw Mining Co. of Birmingham, Ala. They are drilling the blast holes with Ingersoll-Rand wagon drills and have developed a 15-foot face in the quarry.

The Crushing Plant

The broken rock is loaded into trucks by a Lima 3½-yard shovel and a Bucyrus-Erie 51B 2-yard shovel. The trucks carry the material a few hundred feet to a Telsmith 30 x 42-inch primary jaw crusher fed by a 4 x 12-foot feeder. From this, crusher stone drops to the first conveyor, 117 feet x 36 inches, which lifts the material 40 feet to the primary storage pile.

At the bottom of this stockpile is a feeder that sends the stone up conveyor 2. This is another 36-inch belt 155 feet long, on a 20-degree angle to the primary screening plant. There the three larger sizes of stone are screened out on either 5 x 10-foot or 5 x 12-foot double-deck screens, and carried to their respective stockpiles whose centers are 75 feet off the axis of the crushing plant. The 6 to 3-inch stone is

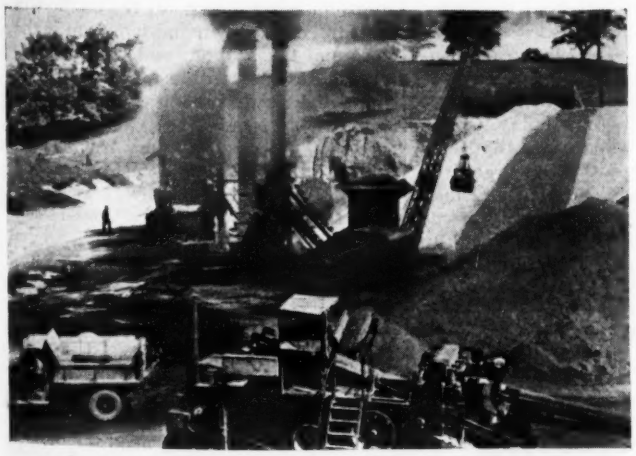
(*Continued on page* 82)

In the photo at the right is the concrete-mixing plant, with two Smith 2-yard tilting mixers. The photo below was taken within the cofferdam at Allatoona Dam, looking up towards the concrete-mixing plant and showing the cableway.

C. & E. M. Photos

When U.S. 20 needed resurfacing

Traffic keeps rolling on U. S. 20, while a mechanical paver lays the new Texaco Asphaltic Concrete surface.



In this efficiently operated plant, the Brooks Construction Company of Fort Wayne, Ind., produced the asphalt mix.

Indiana covered 10 miles with Texaco Asphaltic Concrete

U. S. Route 20 carries heavy traffic across northern Indiana. On a 10-mile section of this important highway near Angola, the concrete pavement no longer provided a smooth-riding surface. The remedy applied by the State of Indiana is the same one successfully employed by many other States for over a quarter of a century. A new wearing surface of resilient, heavy-duty Texaco Asphaltic Concrete has been laid over the existing pavement. This plant-mixed Texaco surface was constructed in two courses, having a combined thickness of three inches.

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A Step in the Right Direction—Education for Construction Career

A forward-looking decision recently made by the University of Mississippi should be applauded by the entire construction industry. For thoughtful engineers and contractors have long been concerned over the gap between engineering theory taught in the civil-engineering schools and the practical problems of construction engineering encountered on the job. Committees have been set up by various organizations, and there has been much discussion of the need for practical training in construction engineering to supplement the theory covered in the traditional engineering-school curriculum.

Now something has been done about that gap. The University of Mississippi has inaugurated with its 1947-48 session a complete four-year course in construction engineering. In addition to the customary engineering courses, students are to have courses in construction estimating, construction plant, methods, materials, design of forms, foundations and earth work, water supply and sewerage, contracts and specifications, and labor problems.

The University's School of Engineering, headed by Dean Lee H. Johnson, is fortunate to have on its faculty two men well qualified by training and experience to undertake courses of this type. They are Professors A. B. Hargis and F. H. Kellogg who, between them, have had over fifty years of construction experience.

In addition—and this is a unique feature of the plan—special lecturers for the coming season will include C. G. Cappel, partner of the W. Horace Williams Co., New Orleans; B. J. Fry, Vice President, E. J. Albrecht Co., Chicago; R. A. Harris, Chief Engineer, Mississippi State Highway Department; Dan Heiple, Field Engineer, R. G. LeTourneau, Inc.; E. L. Mosebaugh, District Representative, Jaeger Machine Co.; Kenneth F. Park, Consulting Engineer, Caterpillar Tractor Co.; F. V. Ragsdale, President, F. V. Ragsdale Co., Memphis; V. L. Snow, Head, Sales Development Department, Euclid Road Machinery Co.; Nello L. Teer, Jr., Vice President, Nello L. Teer Co., Durham, N. C.; Hugh Worley, partner, W. H. Patterson Co., Baton Rouge; and B. F. Worsham, Jr., partner, Worsham Bros. Construction Co., Corinth, Miss.

These men will bring to the classroom the practical knowledge and experience in job planning, in the choice and use of equipment, and in dealing with day-to-day construction problems which they have accumulated through their years in the construction business.

We hope—and believe—that this progressive step in education by the University of Mississippi will inspire other engineering schools to review their present curricula and consider how inadequately they prepare young men for positions of responsibility and service in modern construction. No other profession offers a greater challenge or opportunity to contribute to the welfare of large numbers of one's fellow-citizens and of the country as a whole. That contribution will be much greater and be made sooner, if our young engineers are educated and trained to deal with the highly specialized and technical problems of present-day and future construction.

Our congratulations to the University of Mississippi and to the progressive members of its staff who have had the foresight and courage to take this step. And the best wishes of CONTRACTORS AND ENGINEERS MONTHLY for its success. It should prove to be a two-fold contribution—to engineering education and to the construction industry.

Citizens Write Ticket For Highway Program

A drastic change in previous Oklahoma Highway Commission policy will mark the State's long-range road-building program, it was recently revealed by Highway Director H. E. Bailey.

Local highway wants are to be the guiding principle of the new policy. The Highway Commission, Mr. Bailey said, has been holding a series of meetings in all congressional districts in an attempt to get highway programming wants directly from the people.

Mr. Bailey explained how it works: Communities in the 77 counties of the state meet and decide on their most pressing highway needs. They carry these proposals to a countrywide meeting where the projects are listed in accordance with their importance to the county. Next, county delegates carry the proposals to the Commission, which is composed of eight members, one from each district. Then the proposed projects are incorporated in a statewide plan in which each commissioner is responsible for the proposals submitted from his district.

He added, however, that with highway construction funds at a low ebb, work could not be launched immediately in all cases. But "at least a locally-sponsored program will be in our hands, and construction can follow as quickly as money is available".

He said that past commissions have been continually in hot water with local citizens because they had scheduled construction not believed important enough to localities which were bypassed. By the same token, however, he said some demands have been made for roads which by no stretch of the imagination are feasible.

"Insofar as is feasible, local citizens are going to write the state road program," he said.

The program will be published.

Tolls Not the Answer, Says Western Engineer

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

I have read with interest the editorial in the July issue of CONTRACTORS AND ENGINEERS MONTHLY entitled "Our New Roads — Toll or Free?". As you have ably pointed out, this is a highly controversial subject and one not well understood by the layman. Motorists are becoming impatient at the slowness of highway building, particularly the reconstruction of congested, slow, hazardous sections of road carrying large amounts of traffic.

The writer has contended for many years that not enough attention has been given by the states to the factor of depreciation of highway facilities, most of which has been caused by functional obsolescence. Failure to provide for depreciation may result in a type of bankruptcy of the highway system.

Highway building was not keeping pace with the economic development of the nation before the great depression. The depression materially curtailed highway income and forced drastic reduction in highway construction. This was only slightly alleviated by the various forms of "made-work" relief sponsored by the Federal Government. By the time partial economic recovery was manifest in this country, the Second World War developed. This placed a moratorium on highway construction, except that deemed necessary by the Federal authorities to assist in the war effort.

As a result, for nearly 15 years, highway construction has been slowed down and much needed depreciation restoration deferred until the problem has now become acute and is so recognized by the layman. To add to the difficulties, the dollar has shrunk to a value of perhaps about 60 per cent of its pre-war buying power. It is true that traffic has reached unprecedented heights, and income now, in most states, far exceeds pre-war amounts. But the increase in traffic has brought about problems of congestion and hazard far greater than the additional income can handle, particularly with the depreciated currency. All people naturally resist increase in taxes, but, if the dollar before the war and the depression was inadequate to take care of the problem, the shrunken post-war dollar cannot hope to master the problems engendered by the great increase in traffic. Nor can it be expected to care for depreciation restoration neglected for the past 15 years.

Motorists recognize the acute need of highway reconstruction today. When these needs are compared to the revenues in most states, the time required to do the job indicates that it will take about a generation, or 30 years, to accomplish present objectives, to say nothing of the traffic needs of tomorrow.

In this extremity, many people seize upon the principle of toll highways as a way out of the financial morass. Rather exhaustive studies made in many places indicate that, with possibly a few exceptions, it cannot reasonably be expected that traffic will bear the additional charges on toll facilities for a long enough period to amortize the investment, maintain the facilities, and carry the cost of operation of toll roads, which is in itself a considerable amount. In all probability, many of the groups sponsoring toll roads more or less recognize this condition and have in the back of their minds that within a short period of time they will request the legislatures of the various states to make these toll facilities free and that the states will take on the additional burden.

The administrative authority of each state should make a careful economic study of the needs for road construction, of the benefits that accrue to the motoring public, and of the revenues commensurate to acquire these facilities in a reasonable period of time. The answer to this question will, of course, vary in the various states, but it appears obvious that no further major obligations can be assumed by most of the states unless the fees and taxes for road purposes are materially increased.

Many states now have interim committees studying this subject. Possibly in a few instances toll roads can be justified and found economically sound. But it is the humble opinion of the writer that these are marked exceptions and that in general the public will be far better off in the long run if the fees and taxes upon road users are increased to shorten the time required to build the needed facilities on our state highway systems.

Very truly yours,
R. H. Baldock
State Highway Engineer
Oregon State Highway Commission

Courtesy of National Safety Council

Secondary-Roads Division Recently Created by PRA

A division to handle the secondary-roads program has been created by the Public Roads Administration. The development of this program authorized by the Federal-Aid Highway Act of 1944 and the increasing need for better farm-to-market roads has made it necessary to establish this special division. It will be under the general supervision of Public Roads Deputy Commissioner H. E. Hilts, whose office has performed these duties in the past.

Named as Chief of the Division is A. C. Leonard, former Highway Engineer for Olmsted County, Minn. Mr. Leonard has had broad experience in all phases of secondary-road design, planning, construction, maintenance, and in the administration of county road programs. He holds a degree in civil engineering from the University of Minnesota, is prominent in a number of engineering societies and activities and is on the board of directors of the Minnesota Good Roads Association.

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Plant-Mix Treatment Widens Logging Road

F-A Secondary-Highway Job Puts 4-Inch Layer Of Asphaltic Concrete On County Highway

FOUR inches of asphaltic concrete, put down in two layers, was the Oregon State Highway Commission's answer to some of the heaviest truck loads in the northwest. The work was done on a heavily traveled logging highway near Roseburg, Oreg.

Under a $244,000 state contract, underwritten by Federal-Aid secondary-road funds, the contracting firm of J. C. Compton of McMinnville, Oreg., pushed the 7.84-mile-long job rapidly to completion. Started September 1, 1946, the job was finished by the same date in 1947.

The Compton contract included about 37,000 cubic yards of grading, the repair of the old road over which the new pavement was laid, and the plant-mixing and placing of 22,000 tons of hot-mix asphaltic concrete. The North Umpqua Road, as the contract section is called, normally carries a high traffic count of very heavily loaded logging trucks which haul rich fir stands east of Roseburg to numerous mills near the city. This traffic was maintained through the project as the work went on.

Heavy loads had so deteriorated the North Umpqua Road that the old macadam pavement had broken up beyond the point where further maintenance was justified. The Compton contract consisted essentially of widening and new surfacing from a point 4.5 to 12 miles east of Roseburg, in southwestern Oregon.

The new surface was designed 20 feet wide, with 3-foot compacted-gravel shoulders on both sides of the pavement. Backslopes and cuts were blended in side drains, to carry off the normal rainfall of 33 inches in that part of the state. The old roadbed was straight, so it was used as the base for the plant-mix.

Asphalt Plant Moved In

With an excellent source of rock aggregate within 2 miles of the western end of the job, and an ideal site for the hot-mix plant near-by, a Madsen asphalt plant was brought in and set up about 600 feet north of the highway and 2 miles west of the job. This Madsen 3,000-pound plant has seen ten years of service with the Compton organization, according to its foreman, and has worked all over the northwestern United States.

An assembled crusher was also brought in to produce the various sizes of aggregate. It consisted of Universal and Cedarapids jaw crushers, a Symons cone crusher, and a double-deck set of Simplicity vibrating screens. Rock was produced from a deposit 1,200 feet from the plant, and hauled to the primary hopper by three 4-yard Mack trucks. After the rock had been crushed, it was hauled over to the asphalt plant and stockpiled over the 60-foot conveyor tunnel.

For a while the three sizes of material, exclusive of sand, were produced separately and stockpiled in different heaps. But high-gear work soon caused Compton to group these three sizes at the rock plant, haul them together to the Madsen plant, and let the Madsen asphalt-plant screens take care of the final classification. A minor amount of oversize material rejected by the latter screens was trapped in a 20-ton-capacity hopper and hauled back to the crusher from time to time.

With only about 500 feet of haul between the crusher and the asphalt plant, two 5-yard dump trucks were enough to take care of the stockpiling of aggregate.

The asphalt for the plant-mix was 60 to 70-penetration bitumen, and was shipped in tank cars from the Union Oil Co., refineries near San Francisco, Calif., to Roseburg. At the Southern Pacific railroad siding in Roseburg, asphalt cars were heated by a 2-car Cleaver-Brooks tank-car heater, and the hot asphalt drawn off into a 2,000-gallon truck-mounted asphalt tank. Asphalt with that low a penetration factor had to be heated to 260 degrees Fahrenheit to give it enough viscosity to move.

A haul road was built above the storage tanks at the plant, and the tanker simply dumped the hot material by gravity, through a 30-foot fir-timber flume, to the first of two 6,500-gallon storage tanks near the Madsen plant. All asphalt from the tank cars was put into this first tank. No cool asphalt mixed with the 325-degree material in the other 6,500-gallon "ready" tank.

Both the first and second tanks were

(Continued on next page)

C. & E. M. Photo

A Ford truck on the Compton job brings its load of asphaltic concrete to the scale platform, as the Madsen hot-mix plant in the background loads another truck.

Running when you have time to walk is a waste of energy, especially if you must wait after you get there. Likewise, a portable compressor that always compresses air at its top speed, even though *a much slower speed would often be fast enough,* wastes fuel and causes unnecessary wear.

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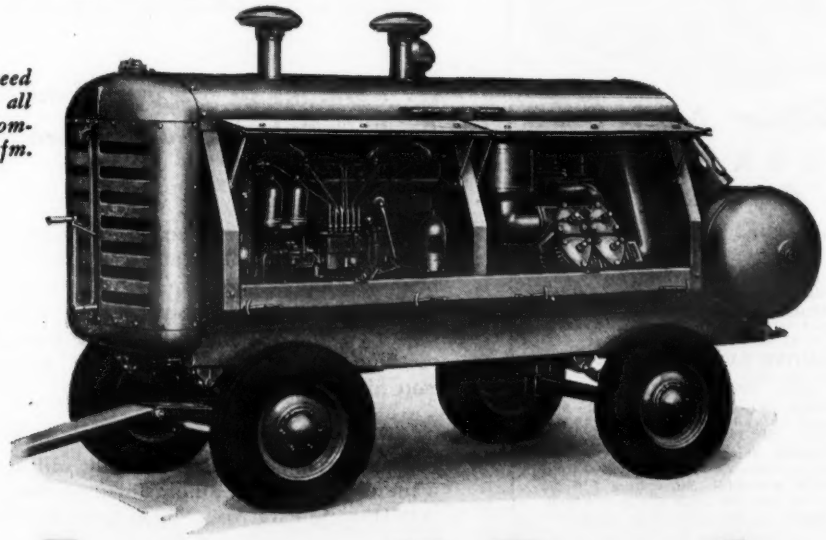

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C. & E. M. Photo
As rakers work with a Barber-Greene asphalt finisher on North Umpqua Road in Oregon, a heavy logging truck goes by on the lane kept open during the job. Loads such as this deteriorated the old macadam pavement and made resurfacing necessary.

Plant-Mix Treatment Widens Logging Road

(Continued from preceding page)

heated by a Gerlinger retort through about 250 feet of 1¼-inch steel tubing inside the tanks. When the cold tank was brought up near application temperature, asphalt was drawn off to the hot tank.

With the plant operating at the rate of 800 to 900 tons in 8 hours, the asphalt pump which supplied a continuous circulation of hot bitumen to the Madsen plant asphalt pot could not keep up. The gasoline engine was removed from this pump and an electric motor of 7½-hp capacity was installed. No trouble was experienced from then on.

The asphalt tanks were tended 24 hours a day. And during the hours of operation, bitumen from the hot tank was circulated continuously to the plant.

In addition to aggregate and asphalt storage, a 10,000-gallon storage tank for heavy fuel for the plant drier burners was installed, along with a 4,000-gallon supply of diesel fuel, and a 1,500-gallon water tank for the generation of steam. The water tank was installed above the plant, and the water had to be hauled by a tank truck from a creek 2,500 feet away from the tank.

Plant Has Efficient Auxiliaries

Especially efficient auxiliary equipment was installed at the plant. A new Cleaver-Brooks Model OB-6 steam generator was brought in and set up. It furnished steam to the asphalt-heating Gerlinger retort, to operate the pugmill gates, to atomize heavy fuel in the drier burners, to operate a steam pump which brought the heavy fuel from storage to the burners, and to heat this fuel to a temperature of 150 degrees before atomization.

The OB-6 Cleaver-Brooks steam generator delivered about 2,070 pounds of steam per hour at an operating pressure of from 110 to 120 pounds. It is a semi-portable unit, weighing 5½ tons. It has a water capacity of 4,380 gallons. This unit was set up close to the drier, with a sheet-metal air duct to bring in cool air from outside the shed.

It might be added here that quite a few characteristics of the new steam generator were learned on this, its first job. In the future, the contractor will set it up at least 200 feet away from the plant to keep the dust from settling around its fully automatic controls. The firebox end will be switched around to the open end of the shed, the clean end away from the asphalt plant.

The Cleaver-Brooks unit is fully automatic. It is its own efficient fireman. Using diesel fuel, atomized by a high-speed fan, it turns itself on automatically and regulates itself to deliver 120 pounds of steam on the gage. The two firemen assigned to the plant 12 hours a day said they merely stopped by once in a while to look at the steam gage. They spent the rest of their time looking after other auxiliary power around the plant.

Other power, in addition to this main source, included a Caterpillar D13000 diesel engine which drove the Madsen pugmill. The 6 x 26-foot single-drum drier was driven by an International UD-9 diesel engine, with an International U-4 on the cyclone dust-collector fan. An International UD-9 diesel also drove a 25-kw generator which furnished electric power around the plant. The Cleaver-Brooks steam generator had various small electric motors. The asphalt pump was motor-driven, and the 60-foot conveyor run in the aggregate tunnel was driven by a 10-hp General Electric motor.

All piping and electric wires were

(Continued on next page)

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Easily Portable

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Photograph courtesy-George Haiss Mfg. Co., New York

Pat. No. 2,280,275
April 12, 1942

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placed underground, so that any equipment might work around the plant without interfering with its operation. If truck-crane repairs had to be made, the truck crane could move around without bumping into electric wires all over the place.

Movement of Material

Various hot-mix-plant operators have tried to rig up some kind of absolutely automatic aggregate-feeding device to the plant. Foreman Al Hughes, who has operated this Madsen plant continuously since 1938, developed a near-perfect one. He calls it his "monkey motion", and he can control the amount of aggregate and sand on the feeder conveyor to coincide exactly with the amount of mixed asphaltic concrete being dumped out the pugmill gates to the batch trucks.

Hughes' device consisted basically of several hopper boxes, made of sheet steel, with rectangular plate feeders designed to operate with a reciprocating movement. A small 2½-hp electric motor, which drove the feeder plates, was geared down to produce 45 openings of the feeder door per minute. The door opening was made adjustable. If more material was wanted, the opening was enlarged slightly. It was closed a bit if too much rock came up to the bins. The feeders were set to operate continuously with the hot-mix asphalt plant.

These feeders were set in the roof of a tunnel under the aggregate stockpiles. Fed to the four mechanical devices by an International TD-14-mounted Isaacson bulldozer blade, the rock and sand dropped down to the motor-driven 60-foot conveyor run. Ordinarily only two of the plate feeders were used, one for sand and the other for ¾-inch-minus material.

A cold-bucket elevator then picked the rock off the end of the conveyor and dumped it into a 6 x 26-foot single-drum drier, where all the moisture was removed from the rock and each particle heated close to 325 degrees. Rock temperature had to be checked occasionally by taking samples on a steel shovel and using a thermometer, for the old-model plant has no thermocouples as newer models do.

After passing through the drier, the aggregate was picked up on an open hot elevator and raised about 28 feet to the top of the plant. There it dropped onto a 42-inch x 12-foot Symons double-deck vibrating screen, which classified the rock into the four sizes required by specifications. The upper deck of this screen was equally divided, half covered with 1-inch-mesh cloth and the remainder with ¼-inch-mesh cloth. The bottom deck was divided equally between ½-inch cloth on the upper side, and No. 10 mesh directly below the ¼-inch screen above it.

After the rock sifted through these screens, it was stored temporarily for use in four bins above the weighing scales. Oversize material rejected on the 1-inch screen passed down a chute to a 20-ton storage bin, where trucks periodically pulled it out and returned it to the crushing plant, or sold it commercially near Roseburg.

Batching Is Precise

The Madsen plant mixed 3,000-pound batches in from 30 to 45 seconds, according to the following formula which was followed exactly:

¼-inch-minus rock	26 per cent	780 lbs.
½ to ¼-inch rock	25 per cent	750 lbs.
¾ to ½-inch rock	21 per cent	630 lbs.
Sand	22 per cent	660 lbs.
Asphalt 60-70 pen.	6 per cent	180 lbs.

Hardy beam scales were used to weigh the aggregates for each batch, and a set of dial scales recorded the proper weight of the asphalt. After a thorough mixing, the batches were dumped out of the Madsen pugmill gates to a fleet of 12 Ford, GMC, and Chevrolet trucks. Each truck was loaded with four full batches, making a 6-ton load per truck per trip.

With nice weather in late July and early August, when the hot-mix was placed, truck beds had to be oiled with diesel fuel only about twice per 8-hour shift, and the loads did not have to be covered with tarpaulins. The day the job was visited for CONTRACTORS AND ENGINEERS MONTHLY, 904 tons of hot-mix were batched out in an 8-hour run, and this figure was not an unusual one.

C. & E. M. Photo
Left to right are H. J. Perkey, Office Manager; Glen L. Rowell, General Superintendent; and M. D. Crittenden, Timekeeper for J. C. Compton.

Trucks backed in under the pugmill gates to pick up their loads, and each load was weighed on a set of Fairbanks platform scales as the truck left the asphalt plant. The state inspector there gave each driver a copy of the weight ticket, which was collected by

(Continued on next page)

FOR SECONDARY ROAD CONSTRUCTION...
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The swirling, chopping action of these tines does a thorough job of mixing, wet or dry.

HERE'S equipment designed especially for mixed-in-place construction—to operate in connection with other general purpose equipment. Wherever aggregates are used it thoroughly pulverizes, mixes and aerates aggregates with binder—rapidly and economically. Also ideal for soil cement stabilization. Safe and easy to operate . . . adjustable to any tractor . . . made 4 standard sizes, 4', 5', 6' and 7'. Write for details.

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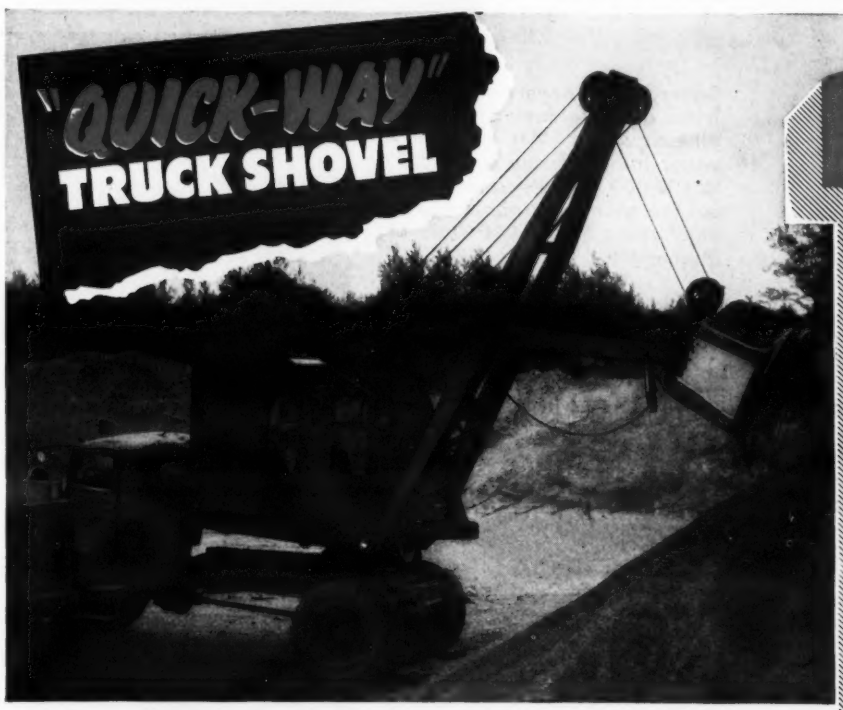

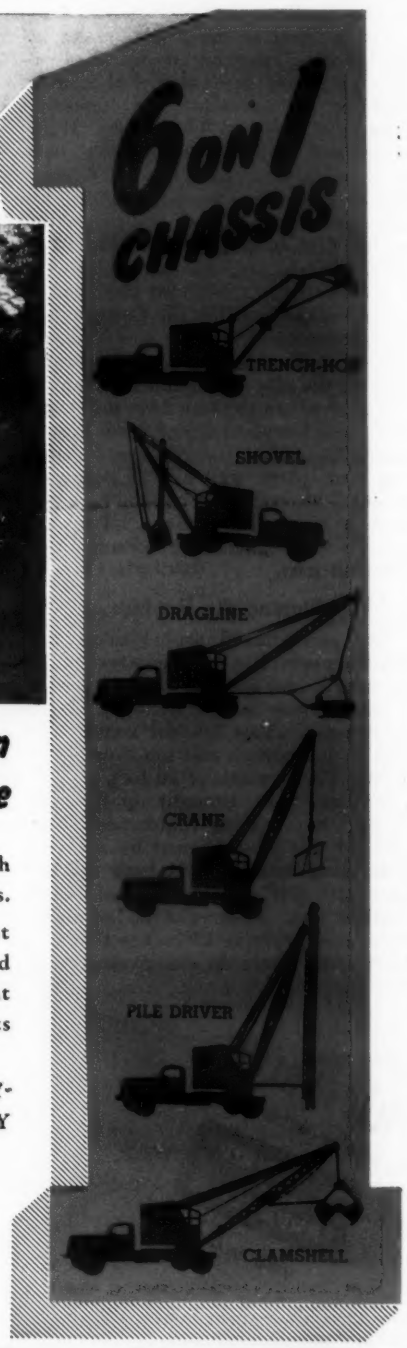

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DENVER, COLORADO

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C. & E. M. Photo
Heavy continuous rolling compacted the asphaltic concrete on the 7.84-mile Oregon job. A Buffalo-Springfield 3-wheel roller appears in the foreground.

Plant-Mix Treatment Widens Logging Road

(Continued from preceding page)

the inspector on the placing end. About half the twelve haul trucks were owned by J. C. Compton, and the rest were rented on a per-hour basis.

The Madsen plant, which has been given a "shot in the arm" by the installation of the big 60-hp Cleaver-Brooks steam generator, has done a number of successful and important jobs in its ten-year life history. Highways and airport paving have been done in Idaho, Washington, and Oregon. Old Number 33, as Foreman Al Hughes affectionately calls this plant, was one of the first to work on the big Walla Walla, Wash., air base during the war.

An interesting sidelight to the plant set-up is the fact that the Compton organization has been able to sell a great deal of crushed aggregate commercially around the city of Roseburg. Many of the lumber camps there have purchased it to build foundations and yards around the mills. After the job was finished, the rock plant was left in operation to stockpile a good supply of crushed rock to meet this demand. Thus the equipment worked to good advantage between jobs.

Placing the Hot-Mix

The plant-mixed asphaltic concrete left the pugmill at a temperature of 325 degrees F and arrived on the job with a temperature loss of between 15 and 25 degrees. Two 10-foot strips were laid on the bottom and top courses, for a total paved width of 20 feet.

The old road, brought up to grade earlier by grading equipment, was patched and strengthened by applying a leveling course of ¾-inch crushed aggregate and a base course of 2-inch crushed rock. In some of the low places this aggregate was 12 inches thick; in a few spots where the old pavement was still good none was required. A few of the bad holes were also strengthened with bituminous mix.

The leveling course was bladed in smooth by a Caterpillar No. 12 and an Adams Model 512 motor grader, and the entire 7.84-mile stretch was then tacked with 0.3 gallon of RC-3 asphalt per square yard. This was applied 10½ feet wide with two passes by a Gerlinger pressure asphalt distributor. The asphalt was then covered by a light blot coat of ¾-inch-minus crushed rock to soak up the asphalt, and the surface was opened to traffic for about a week before hot-mix paving began.

The RC-3 asphalt, applied at a temperature of 225 degrees, penetrated the old surface about ⅜ inch, according to Paving Foreman Cecil Hughes.

Hot-mix then came in from the plant, and was laid in strips 10 feet wide. The bottom course was laid to a compacted thickness of 2½ inches; the top course 1½ inches thick. All the run of one day, however, was placed on one side of the road, either on the bottom or top course but never on both, and traffic was maintained only on one side. A pilot guide on a Salsbury motor scooter led one-way traffic through the job.

The batch trucks dumped their asphaltic concrete into the receiving hopper of a Barber-Greene Model 879-A asphalt finisher, which stayed on a straight line with the help of a string guide set by surveyors on the center line of the road.

The placing crew consisted of 13 men, including 2 flagmen and the driver of the pilot scooter. Cecil Hughes, 23-year-old Paving Foreman with more actual years of experience than many of the old-timers, directed the operation. The crew consisted of a finisher operator, a dump man, a feeder-box tender, a raker, 3 laborers, and 2 roller men.

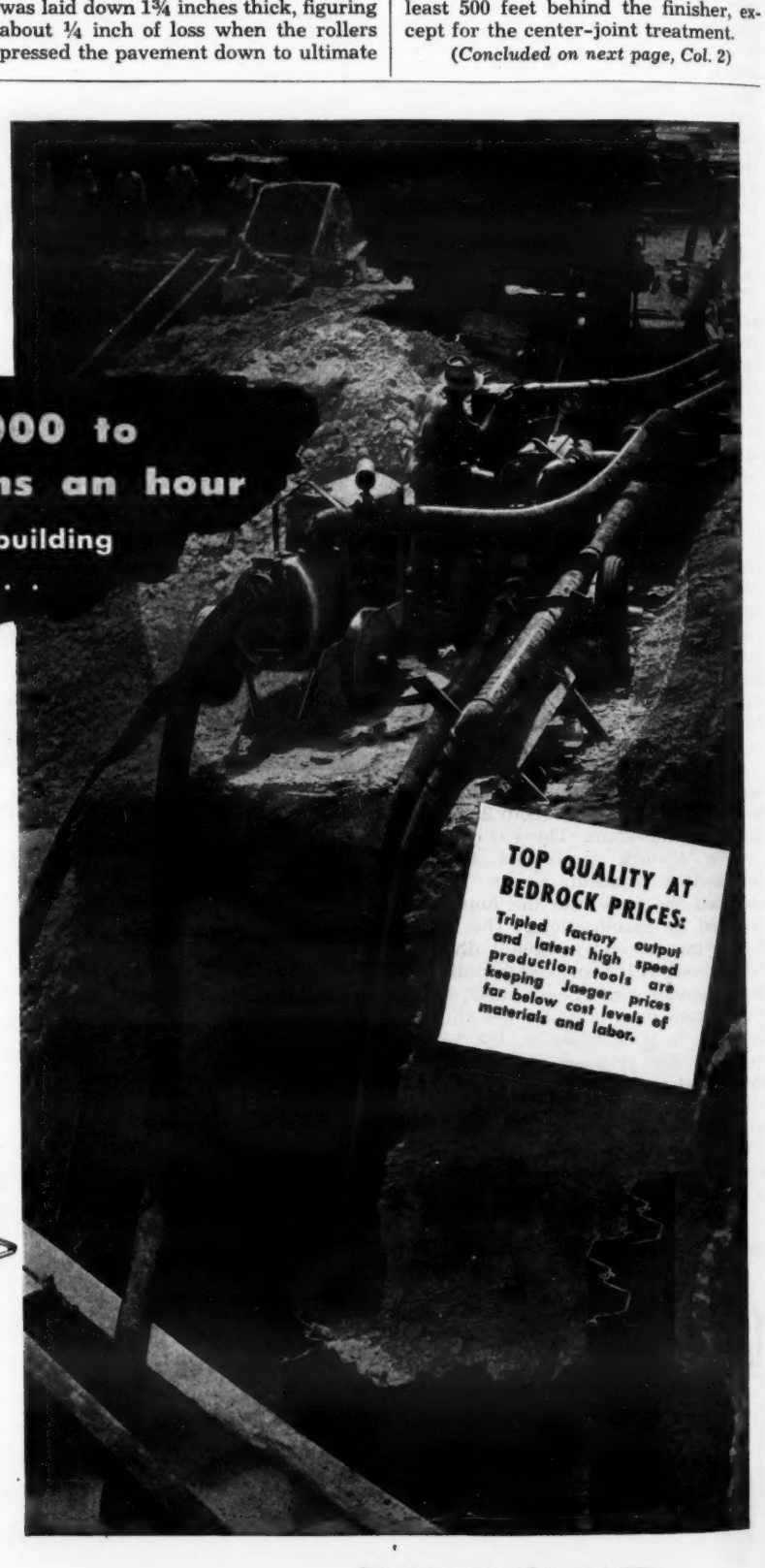
The bottom course was placed 3 inches thick, allowing ½ inch of loss in the compaction rolling. The top course was laid down 1¾ inches thick, figuring about ¼ inch of loss when the rollers pressed the pavement down to ultimate density. Fully compacted, the asphaltic concrete weighed 110 pounds per square yard per inch of thickness.

Very careful attention was given to the longitudinal joint in the center of the road, both on the bottom and the top strip. As soon as the Barber-Greene finisher went by, a raker directly behind the machine carefully smoothed the trail along the joint with the back of a garden rake. Excess material was distributed over the spread lane.

The joint was then immediately rolled by a Buffalo-Springfield 10-ton 3-wheel roller, putting just enough of the wheel over the joint to iron it in smoothly. Work on this joint was repeated when the 3-wheel roller was used on the breakdown rolling. Breakdown rolling for the first-stage compaction depended a great deal on weather, with some variation in the time after pavement was laid before rolling was attempted. Rolling always stayed at least 500 feet behind the finisher, except for the center-joint treatment.

(Concluded on next page, Col. 2)

Battery of 4 Jaegers worked 24 hours a day to dewater elevator pit excavation 12 ft. below low water table, at rate of 400,000 to 500,000 g.p.h.—one of many Jaeger pumping jobs on Burdine's new $1,000,000 store at Miami, Fla.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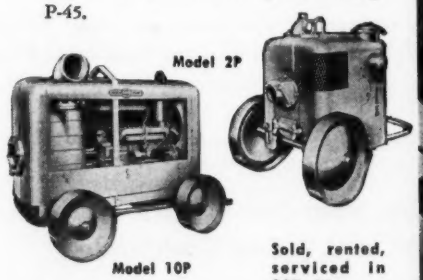
Whenever water problems are encountered, on jobs that can't risk waiting, there's usually a hurry-call for the nearest Jaeger distributor.

He's the leading pump dealer in your locality. He keeps a big stock of pumps and fittings ready — for sale or rent. And they are all Jaeger "Sure Primes," built and powered beyond their guaranteed performance, individually tested and certified, doubly sure and faster to prime, and fully enclosed from dirt and weather to keep both pump and engine operating at top efficiency for years of extra-satisfactory service. Sizes 1½" to 10". Ask for complete Catalog P-45.



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Workman affixes caps to the free ends of the dowels in one of Bethlehem's new road-joint assemblies.

New Road Joint Unit For Concrete Paving

A new dowel-bar load-transfer unit for use in expansion and contraction joints has been announced by the Bethlehem Steel Co., Bethlehem, Pa. According to the manufacturer, these units, when once placed on the subgrade and secured, will hold the dowels in proper alignment and level. Weight of a 12-foot unit is 84 pounds, and they are said to be easily handled by two men.

To provide equal and adequate support for both ends of the dowels in the Bethlehem unit, they are divided into two groups. Alternate dowels are rigidly welded to one side frame and one center wire, while the remaining dowels are welded to the opposite side frame and center wire. With this arrangement, the two halves can be drawn apart for insertion of the filler strip. When the two halves are restored to their original position, the center wires perform the function of keeping the filler vertical at all times.

Metal caps are provided for the free ends of the dowels to permit their unrestricted movement in the concrete during expansion and contraction. To prevent them from adhering to the concrete, the dowels are painted with bitumen before installation.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 9.

Hook Fitted to Cable

A device for securing hooks to the ends of wire rope and cable has been announced by the Electroline Co., 4121 So. LaSalle St., Chicago 9, Ill. It is said that the Electroline-Fiege connector, built as an integral part of the hook, can be attached quickly and safely.

The connector is made up of three parts: a sleeve, fluted plug, and socket. Wire rope is passed through the sleeve and the strands broomed out for inserting the plug. The plug is then slipped into the sleeve, with each strand of the wire rope dropping into one of its grooves. The socket, to which the hook is attached, is then screwed on, making a tight, secure fit. An inspection hole is provided to examine the fitting after it is completely assembled.

The forged steel hook is available in stationary or swivel types. There are ten sizes for use with wire rope from ¼ to 1-inch diameter, inclusive.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 2.

Sales Mgr. for Ryan Co.

The appointment of Roy H. Smallwood as Sales Manager has been announced by The Geo. T. Ryan Co. of Minneapolis, Minn. Mr. Smallwood for the past two years has served as Advertising and Sales Promotion Manager of the American Hoist & Derrick Co.

The Ryan Co., located at 171 27th Ave., S.E., is distributor for LaPlant-Choate earth-moving machinery, Jaeger equipment, Galion power graders, Buckeye ditchers and shovels, Oliver-Cletrac crawler and industrial tractors, and other lines of construction materials and equipment.

Plant-Mix Treatment Widens Logging Road

(Continued from preceding page)

Final rolling, carried on for several hours until the pavement cooled off, was done by an Austin-Western tandem 8-ton machine, working behind the 3-wheel roller. In general the rolling was all done longitudinally, but there were of course some exceptions. Where occasional humps were encountered, or where a joint was made on the previous day's run, cross rolling was necessary.

The joint at the end of a day's run had to be raked down to a feather edge to blend with the old pavement. This made the passage of vehicles easier and safer than if the joint had been formed square. Special attention was given to the top layer on this joint. The asphaltic mix was raked in carefully to the right thickness, and the joint ironed out smooth with the rollers.

Some good footages were laid. On the day when CONTRACTORS AND ENGINEERS MONTHLY's Western Editor visited the project, work was under way on the 2½-inch bottom layer. The 904 tons of mix batched that day laid 5,990 feet of 10-foot strip—more than a mile.

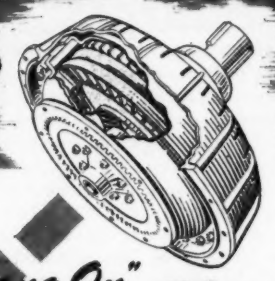
The edge of finished asphaltic pavement was then protected by hauling the first of the crushed-rock shoulder material in, dumping about 18 inches wide along the side through a shop-built tail-gate spreader box, and sweeping off the excess with a Fordson-drawn broom. This little ridge of rock prevented the heavy logging loads from breaking down the edges. Final shoulder work was done after the pavement was finished.

Personnel

The job was supervised in the field by Glen L. Rowell, General Superintendent for J. C. Compton, with H. J. Perkey and M. D. Crittenden as office administrators. Al Hughes was the Plant Superintendent, C. E. Layton was the Plant Inspector, and Cecil Hughes was Paving Foreman. The State was represented by L. H. Young, Resident Engineer. K. D. Lytle is Division Engineer.

R. H. Baldock is State Highway Engineer, with H. G. Smith State Construction Engineer.

THE "820" CAN DO MORE... CAN TAKE MORE... because the hydraulic clutch



Absorbs Shock

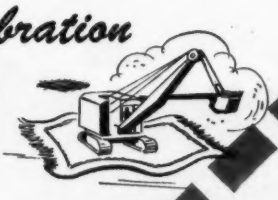
The L-820 is free from the inevitable and unavoidable shocks and impacts, resulting from heavy-duty digging, because its Hydraulic Clutch absorbs and cushions the costly strains and stresses on the mechanism and cables.

Improves "Hang On"

You can "slug it out" with rock knowing that the L-820's great digging power won't fade or fizzle but will "hang on" until the most unyielding rock is in the dipper.

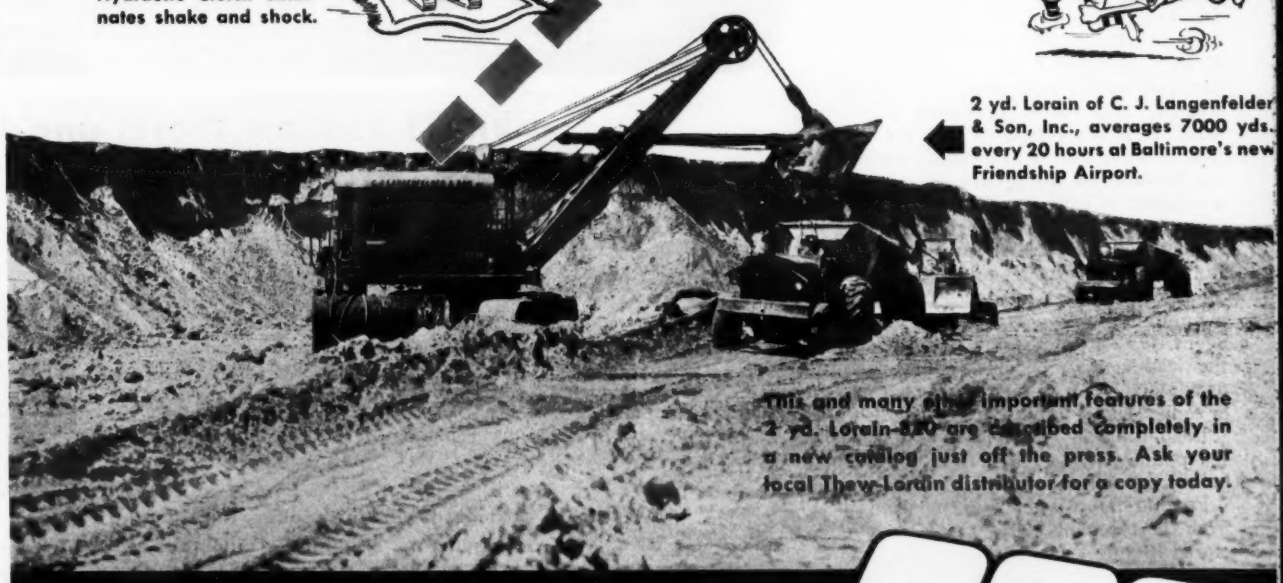
Reduces Vibration

The L-820 is a smooth operator because the Hydraulic Clutch eliminates shake and shock.



Prevents Stalling

You can't stall the engine under any digging circumstances.



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THE THEW SHOVEL COMPANY • LORAIN, OHIO

Thew Lorain® 820

The Jaeger self-priming centrifugal pump with protective housing is shown here. Side panels in the cover give access to all operating parts.

Pump Cover Protects Engine from Weather

A self-priming centrifugal pump with a housing which protects the engine and the pump from weather, dirt, and water, is made by the Jaeger Machine Co., 701 Dublin Ave., Columbus 16, Ohio. The company points out that keeping water from spark plugs, carburetor, and crankcase insures quick starting and more efficient operation, as well as longer engine life.

The cover is designed with side panels to give access to all operating controls. Enclosures on small pumps also lift off when necessary. On larger pumps the housings give easier access to engine parts and their entire pump end is hinged to swing completely open.

Priming is accomplished by combining inherent priming action with jet priming. Features of construction listed for this line of pumps include: replaceable liners or seal rings, Jaeger patented Lubri-Seal which is accessible for inspection, self-cleaning shell design, and open-type impellers which are adjustable for wear.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 42.

Lubricating Agent Yields Cover of Lead

A lubricating agent which is said to protect gear and bearing surfaces by providing them with a coating of lead has been developed by Knapp Mills, Inc., 121 Broad St., New York, N. Y. Known as Lead-Lube, it is designed particularly for equipment exposed to weather and severe operating conditions. It is a mixture of fine metallic lead powder and a lubricating grease; the function of the grease is to act as a vehicle for carrying the lead powder over gears and bearings.

According to the producer, Lead-Lube fills score marks, pits, grooves, or other imperfections; reduces friction to a minimum; and acts as a lubricating agent. It is further stated that because the lead coating becomes the surface of contact, wear on gears and bearings is reduced to a minimum.

Lead-Lube is available in 25, 50, or 100-pound pails, and 200, 350, and 500-pound drums.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 1.

Concrete-Slab Vibrators

A catalog describing the Jackson vibratory paving tube can be obtained from Jackson Vibrators, Inc., Ludington, Mich. Feature of Catalog No. 447 is a list of nine benefits the Jackson firm claims will be derived from the use of this paving tube.

Photographs are used to illustrate the full range of adjustments for slabs from 6 to 24 inches thick. Another photograph shows the unit in use, and arrows point out the location of the various parts and controls. The final page carries complete specifications for the Jackson paving tube.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 78.

Exhaust-Pipe Cover

A device for protecting open, upright exhaust pipes on tractors is made by the Waterloo Foundry Co., Waterloo, Iowa. Designed to protect the tractor exhaust system and engine from rain and weather, the Raincap is made of aluminum in sizes to fit most wheeled and crawler-type tractors.

The manufacturer states that in operation the Raincap is held open by exhaust pressure; but when the engine stops, the counter-balanced cap automatically closes.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 93.

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✔ Stops Skids Quicker ✔ Lasts Longer

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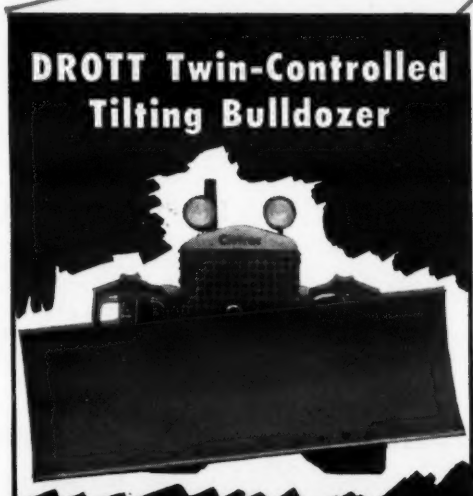

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- Closed Hydraulic System
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- Independent Tilt — either side hydraulically raised or lowered from operator's seat
- Cradle Lift — simple, strong construction
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DROTT Twin-Controlled Tilting Bullangledozer

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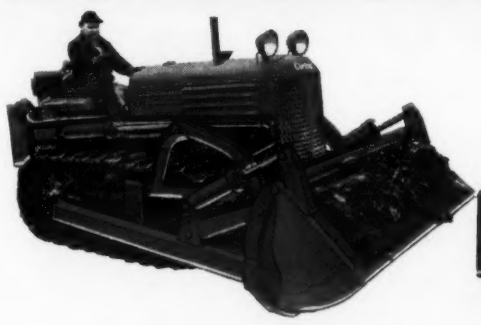

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Welded-Steel Bridge Built Over Waterway

(Continued from page 1)

bank, and then swung back when the boat had passed. The ramps were then lowered back into position and highway traffic was resumed.

Concrete-Pile Foundation

As the site of the original crossing was selected for the new structure, the contractor first had to shift this floating bridge slightly to the west. Approach fills to the barge were built up and traffic was maintained on this detour during construction. Concrete piles were then cast and driven to form the substructure of the lift span. A total of 98 reinforced-concrete piles, 18 inches square x 44 feet long, was required for the two dual piers under the towers and for the two end bents.

Driving of the pier piles was done from a barge by a Northwest crane fitted out with a 95-foot boom. This great boom length was later used to advantage during the erection of the steel towers. The piles were jetted at first, using water pumped from the channel by a Deming 6-inch pump driven by a Continental gas engine. Then a Vulcan No. 1 hammer working in 40-foot timber leads reinforced by steel, with steam furnished by a 60-hp boiler, drove the piles through sand and hardpan to an average penetration of 24 feet. The cut-off elevation of the piles is 8.5. As the end bents are well back from the bank, the piles in these were driven with the rig on land.

Pier forms were then built of ¾-inch sheeting with 2 x 6 studs on 16-inch centers, and double 2 x 6 wales on 30-inch centers for the average panels. The distance on centers between the two lift piers is 107 feet for the main span. Two other spans on each side complete the structure; the span supporting the tower between the lift and approach piers is 28 feet 6 inches, while the span back to each end bent is 35 feet 6 inches. This makes the total bridge length 235 feet. Mean low water is 0.0 elevation, and the 12-foot-deep channel extends under both lift piers for a bottom width of 125 feet before rising to ground level on a 2 to 1 slope.

The 28½-foot tower spans rest on four concrete piers supported on piles and tied together by concrete girders forming a nearly square substructure. The two piers nearest the channel are known as the lift piers, while the two to the rear are the approach piers. The bottoms of the piers are 1½ feet above mean low water, and are 9½ feet thick, extending from elevation 1.5 to elevation 11.0. At the top the lift and approach piers are 7 and 6 feet square respectively; the dimension along the bottom of the span increases to 10 feet 2 inches and 9 feet 2 inches respectively as the sides slope downwards. The concrete connecting members are 4 feet deep x 2½ feet wide along the sides, while the transverse sections are 4 feet square.

All but the center lift span has a concrete superstructure consisting of five beams, 1 foot 2 inches wide x an average of 2 feet 1 inch deep, supporting a 7-inch deck slab. The roadway is 26 feet, flanked on each side by a 3-foot 9-inch sidewalk with a 3-foot concrete hand-rail.

Concrete was mixed in Jaeger 10-S and 14-S 2 and 3-bag mixers, set up on the banks or the deck already poured. It was either chuted to the forms, transported there in ¼-yard 2-wheel concrete buggies, or in a 1-yard concrete bucket, according to the section under construction.

Much of the form cutting was done with Black & Decker 6 and 7-inch-diameter circular saws powered by a Kohler 1½-kw generator set. The latter unit was also used later during the steel work to drive a couple of Thor electric drills for cutting plugs in the welds or drilling holes in the lifting machinery.

C. & E. M. Photo

Here we see under construction the new bridge over the Intracoastal Waterway at White City, Fla. The Northwest crane played a major role on the job, both driving pier piles and setting steel in place in the towers.

Mall vibrators were used during the pouring operations, and the concrete was cured either with wet sand or burlap saturated with water.

Construction Materials

Fresh water for the concrete was obtained from a wellpoint driven 25 feet

(Continued on next page)

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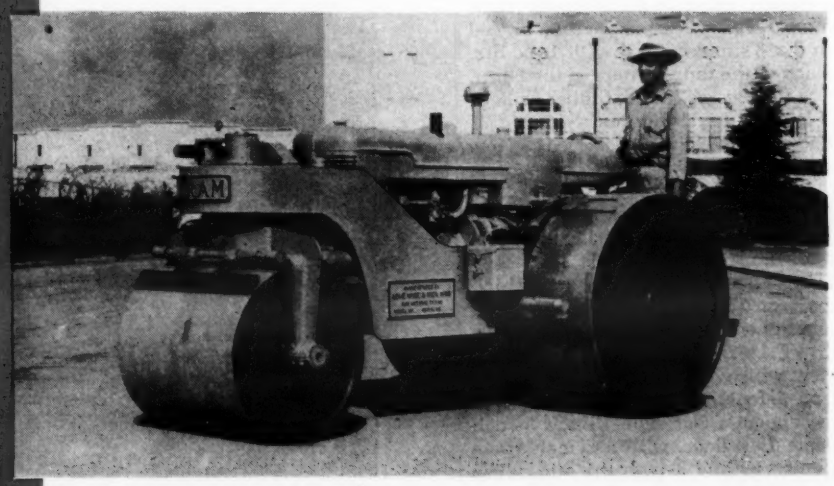

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Welded-Steel Bridge Built Over Waterway

(Continued from preceding page)

into the ground a short distance back from the waterway. The Lehigh Portland Cement Co. at Birmingham, Ala., supplied bag cement and shipped it by rail to Port St. Joe which is on the Apalachicola Northern Railroad connecting to the Louisville & Nashville Railroad at Chattahoochee. Reinforcing steel was shipped the same way from the Virginia Bridge Co. plant also at Birmingham. In similar manner the gravel for the coarse aggregate was received from the Roquemore Gravel & Slag Co. of Montgomery, Ala. Local hauling contractors unloaded these materials and hauled them the 7 miles to the bridge site from Port St. Joe. The Brewton Engineering Co. at Panama City, Fla., furnished the sand and delivered it to the job in trucks.

A typical 3-bag batch of concrete by weight was as follows:

Cement	282 lbs.
Sand	519 lbs.
Gravel	1,080 lbs.
Water	17 gals.

The sand and gravel met these gradation requirements:

Sieve Size	Per Cent Passing Gravel	Sand
2-inch	100	....
1½-inch	95-100	....
1-inch	85-100	....
¾-inch	60-90	....
½-inch	30-60	....
No. 4	0-6	100
No. 10	....	95-100
No. 40	....	47-85
No. 80	....	12-45
No. 200	....	0-5

The structural steel for the steel towers and lift span came from the Virginia Bridge Co. and was shipped by rail from Birmingham, Ala., to Port St. Joe. There it was unloaded to barges and towed through a 6-mile cut-off channel connecting a paper mill with the Intracoastal Waterway. The two trusses for the 105-foot lift span came already assembled, but the rest of the span was welded together at the jobsite.

Lift Span

In a small inlet along the north shore of the Waterway just east of the bridge site, timber falsework pile bents were constructed. On these the lift span was assembled. Double bents, 105 feet on centers, were built of ten 38-foot-long timber piles having 12-inch butts and 7-inch tips. The double rows of piles were 5 feet on centers, and the lateral spacing of the piles was 5 feet, 16 feet 6 inches (twice), and 5 feet again. Piles were driven by the Northwest crane on the barge, using a 3,000-pound drop hammer. The piles were cross-braced with 2 x 8's and capped with 10 x 10's. At each of the four corners of the bents, where the trusses rested, timber grillage was laid out to distribute the load.

The steel, which was carried on one barge, was then assembled by the crane and joined by welding. A Lincoln 200-amp and a Wilson 300-amp electric welders were used on the lift span and the towers.

The trusses are 12 feet 6 inches high and are on 33-foot 6-inch centers. Near the bottom they are connected by 30-inch WF 116-pound I-beams on 15-foot centers which carry 14-inch WF stringers on 4-foot 2-inch centers. These in turn support a Carnegie-Illinois 5-inch I-Beam-Lok floor, with a 2-inch spacing one way and 3-inch the other. The steel arrived painted with a shop coat of red lead. On the job it received some spot painting with red lead. All the steel work, including the machinery, was also painted with two coats of black graphite. Painting was done with two DeVilbiss spray guns from a 10-gallon tank of paint. An Ingersoll-Rand 105-cfm compressor supplied air for the spraying.

C. & E. M. Photo

The lift span was assembled on solidly constructed pile-bent falsework. The barge beneath is one of two used to float the assembled span to place.

Work on the lift span began in October, 1946. When the concrete decks were completed in December, the erectors began to assemble the steel and to erect the 105-foot-high towers, using the 95-foot boom on the crane. In these operations the crane worked from a grillage set up on the concrete decks. It consisted of four 18-inch I-beams, 72 feet long, on 4-foot centers, and covered with timbers.

On the lower half of the tower 7/16-inch welds were used and 5/16-inch on the upper half. At the base the towers measure 36 feet 9 inches wide x 28 feet long, but at the top, while the width is the same, the length is but 8 feet because of the slope on the back members. The towers are made up chiefly of 12-inch WF 25 and 40-pound beams.

The towers were completed early in February and plans were then made for moving the completed lift span from the inlet where it was assembled to its place in the bridge. The work bents had been constructed to such a height that the span was about 18 inches higher than the plane where it would actually seat. Two wooden barges, 28 x 70 feet,

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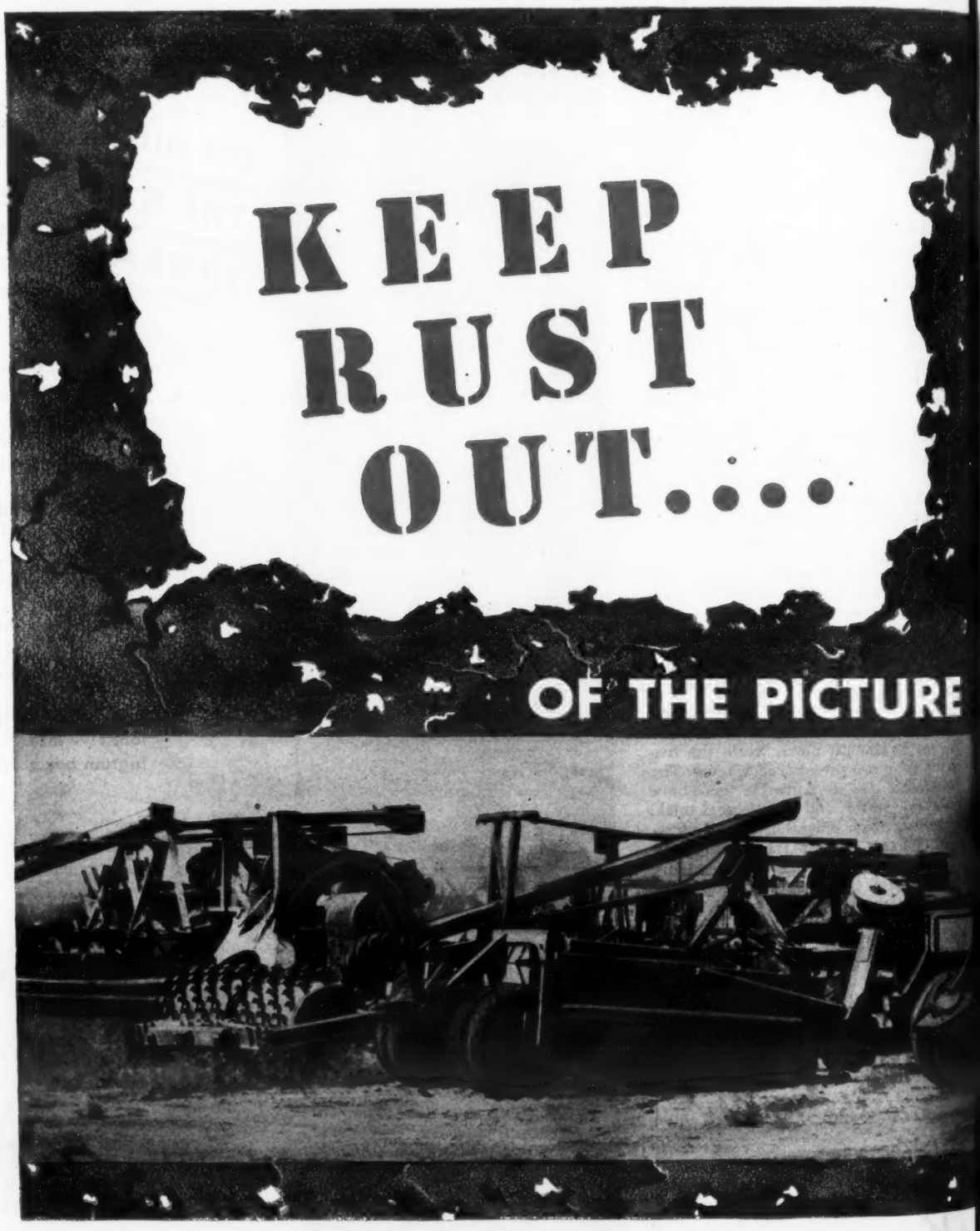

were then maneuvered under the span so that they were at right angles to the center line of the span. The water with which they had previously been loaded was then pumped out with 6-inch pumps until the barges, as they lightened, were raised, taking the full weight of the lift span themselves.

In the middle of the week when water traffic was lightest, the barges with the lift span were pulled into position with four 1-inch rope lines. Workers on the banks furnished the power. The barges were then pumped full of water, lowering the lift span 18 inches to its exact position in the new structure, and the barges pulled out. The uphaul and downhaul ⅝-inch cables were then attached to the span, the entire operation taking approximately 7 hours. In the lower position the span will have a vertical clearance of 12 feet, and when it is raised the clearance will be increased 70 feet.

Counterweights

The weight of the assembled lift span alone is 122,020 pounds. To this are added 84,720 pounds of flooring and 21,130 pounds of machinery for a total weight of 227,870 pounds which must be balanced by counterweights. Theoretically each counterweight should weigh half of this total or 113,940 pounds. Actually, however, pockets were provided in the counterweight so that 3½ per cent of each counterweight by weight could be deducted, if necessary; and balance blocks were made to represent 5 per cent of the calculated weight which could be added, if required.

C. & E. M. Photo

A Northwest crane with a 95-foot boom sets in place a counterweight sheave cover on the top of the south tower of the bridge. This member is the highest piece of steel on the Cleary Brothers Co. bridge job.

The counterweights measure 33 feet 2 inches x 4 feet x 8 feet deep, and weigh 109,940 pounds each. The 4,000-pound difference between the actual and theoretical weight of 113,940 pounds represents the deduction for the pockets. The actual weight is made up of 720 cubic feet of concrete at 145 pounds per cubic foot or 104,400 pounds, 2,900 pounds of steel reinforcement, and 2,640 pounds of structural steel. Each counterweight is provided with 60 concrete balance blocks weighing 97 pounds each to make up the 5 per cent of the total weight.

C. & E. M. Photo

Steel in the lift span of the new highway bridge at White City, Fla., is all welded—most of it at the site. Here, at bridge-deck level, a 200-amp Lincoln welds a counterweight guide.

The load of the lift span and counterweights is carried by sixteen 1¼-inch cables, while the hoisting is done with ⅝-inch cables. Cable was furnished by the Hazard Wire Rope Division of the American Chain & Cable Co. and included 16 reels, 95 feet each, of 1¼-inch cable, and 8 reels of ⅝-inch cable, 4 of 180 feet, and 4 of 158 feet in length. The four sheaves at the top of the towers are 6 feet in diameter, and each sheave takes a dead load of 126 kips, plus a 20 per cent impact load of 26 kips for a total load of 152 kips. The bridge is operated from a 12 x 18-foot control house located in the north tower.

One of the concluding operations was the driving of a fender system of protecting piers between the towers, affording 86 feet of channel for navigation. The timber piles were driven from a floating rig consisting of a 16 x 35-foot wooden barge equipped with a 40-foot A-frame, a 2-drum hoist and engine, and a 3,000-pound drop hammer.

The approach fills for the ½-mile project were subcontracted to Coggins & Deermont Construction Co. of Chipley, Fla., which took material from a borrow pit 2,000 feet away. A 22-foot pavement was laid, using 6 inches of sand-bituminous road-mix, shaped to a crown of ¼ inch to the foot. The 9-foot shoulders have a slope of ¾ inch to the foot.

Quantities and Personnel

An average force of 23 men was employed on the bridge, consisting of a crane operator, 2 welders, 5 carpenters, 5 structural-steel workers, and 10 laborers. The major items of the contract included:

Excavation, approach fills	54,292 cu. yds.
Concrete, substructure	289 cu. yds.
Concrete, superstructure	175 cu. yds.
Concrete, counterweight	61 cu. yds.
Reinforcing steel	66,551 lbs.
Untreated-timber piling	4,800 lin. ft.
Treated-timber piling	10,400 lin. ft.
Precast concrete piling, 18-inch square	5,900 lin. ft.
Steel bridge floor	2,831 sq. ft.

For the Cleary Brothers Construction Co., V. P. Langford was Superintendent. J. H. Langford is General Superintendent of the company. To date, only three all-welded-steel vertical-lift bridges have been built in the southeastern part of the United States. All three were built by Cleary Brothers Construction Co., and in Florida.

D. A. Campbell was Project Engineer for the Florida State Road Department. The project is located in the Third Division which is headed by H. H. McCallum, Division Engineer. F. Elgin Bayless is Chairman of the Department, E. C. DeGarmo is State Highway Engineer, and E. S. Fraser is Bridge Engineer.

The 1947 Community Chest drive needs your support. Essential welfare services for the needy, the sick, the old, and the young depend on your generosity. So give all you can.

WHEN YOU lay up your equipment, brush *Texaco Rustproof Compound* over all exposed metal surfaces. They'll be safely and economically protected against rust by a soft, self-healing, *waterproof* film that removes easily when your equipment goes into service again.

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Rustproof Compound

Technical Data Booklet On Wire-Rope Engineering

A booklet containing 148 pages of technical data on wire-rope engineering has been made available by John A. Roebling's Sons Co., 640 So. Broad St., Trenton, N. J. The articles it contains on the correct and economical use of wire rope were originally published in a series of bulletins. They have now been compiled in a single pamphlet.

What is wire rope? What are the various means of building it up? What are the styles in which it is made? And what is the purpose of the core? These are a few of the questions answered by Catalog No. A-872. It also tells how to handle wire rope, how to unwind it from the reel, how to avoid kink damage, how to determine the proper sheave or groove sizes, how to wind it, how to install shaft and hoist ropes, and how to attach clamps.

The book discusses the stresses to which wire rope is subjected; to aid in determining remaining strength, it gives mathematical formulae for theoretical calculations, and graphs for analytical and geometrical determinations.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 67.

Air-Compressor Catalog

Publication of a new folder describing its portable compressors has been announced by the Davey Compressor Co., Kent, Ohio. Featured in Form No. E-216 is a description of the Davey Equi-Balanced crankshafts. These crankshafts are said to reduce vibration and rocking to a minimum. The folder also tells of the Davey valves, said to assure constant top operating efficiency with a minimum of upkeep or maintenance.

The bulletin contains photos and detailed mechanical specifications of the 60, 105, 160, 210, and 315-cfm Air Chief portable compressors.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 90.

New Holland District Mgr.

The appointment of Franklin M. (Mac) McCorkel as District Manager has been announced by the New Holland Mfg. Co., Mountville, Pa. Mr. McCorkel will handle the territory of Ohio, Kentucky, Michigan (except for the upper peninsula), West Virginia, and Tennessee east of the Tennessee River. He will locate his office at 101 No. High St., Columbus, Ohio.

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New GAR WOOD DOZECASTERS, TIPDOZERS, SCRAPERS, RIPPERS for *the World's Largest, Most Powerful Tractor*

Now available, Gar Wood equipment designed especially for the new Allis-Chalmers HD-19 consists of a full line of 4 Wheel Scrapers, Tipdozers, Dozecasters and Rippers. *Field tested* under extreme conditions this equipment incorporates the latest design advances to give maximum performance and utility with a minimum of down time. See your Allis-Chalmers dealer for details.

NEW GAR WOOD SCRAPERS for the HD-19 have these job proven features:

Easy loading—with proper pitch to cutting edge to give live, boiling action to dirt.

Proper location of draft point for maximum digging ability.

Positive rolling ejection of load because of less friction of dirt with pivoted type bowl.

High ground clearance, with low center of gravity for stability.

Simplicity of design for low upkeep.

NEW GAR WOOD TIPDOZERS and DOZECASTERS for the HD-19 have these job proven features:

Curved moldboard to keep live load ahead of blade.

Better balance with moldboard closer to tractor radiator.

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New simplified design gives clean cut appearance.

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Road Work on Increase

Present indications show an upward trend in highway construction for 1947, said Charles M. Upham, Engineer-Director of the ARBA, at a recent highway conference. While relief from congested and outmoded roads will take time, the road-building forecast shows mounting activity for 1947 and 1948. Total highway-construction expenditures for the nation are estimated at $1,250,000,000 for 1947, a gain of more than $500,000,000 in dollar volume over the 1946 program.

Mr. Upham cited as a typical example of the increasing activity, the construction program under way in North Carolina. That State estimates that about 11,186 miles of highway will be graded, surfaced, or stabilized this year at a cost of nearly $44,000,000. State officials say that this is the largest highway expenditure ever planned by the State in a single year. About three-fourths of this amount is being spent for the improvement of county roads.

Truck Lubrication Spex

A lubrication prescription manual has been issued by the Alemite Division of the Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill. This is the first edition of the manual since 1942, and it contains specifications for lubricating 1946 and 1947 trucks and cars, as well as for several prior years.

An innovation in this year's 38-page 9 x 12-inch manual is a chart of lubrication-point locations for each vehicle covered. Another feature is a chart of gas tank, crankcase, radiator, and gear case capacities. Oil and grease viscosities, at various temperature ranges, are given, according to the manufacturers' recommendations. The lubrication wall chart, formerly published concurrently with the manual, is scheduled to be resumed with the 1948 manual.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 52.

Sales Div. Promotions

Four advancements in its Equipment Sales Division have been announced by Raybestos-Manhattan, Inc., Passaic, N. J. Harry C. Dishman has been named Equipment Sales Manager with headquarters in Detroit; George T. Young will be Branch Manager of the Detroit office; E. E. Juergens has been appointed Branch Manager of the Cleveland office; and John E. Cole will be Branch Manager of the Chicago office.

Allis-Chalmers HD-19

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- Weight: 40,000 pounds.
- Power: 2-Cycle General Motors Diesel — 163 hp. at flywheel.
- Torque converter automatically balances load and speed without gear-shifting.
- Speeds: 0 to 3.0 in low gear and 0 to 7.0 in high; reverse, 0 to 5.5.
- More traction, more ground contact, better balance.

BUILT TO LAST LONGER WITH LESS UPKEEP

- Torque converter smooths tractor performance—cushions engine and transmission from shock loads.
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TRACTOR DIVISION — MILWAUKEE 1, U.S.A.

The Problem of Traffic On Highway Projects

Contractor Describes Measures to Prevent Accidents to Both Traffic and Employees on Jobs Through Which Traffic Is Moving

✦ IN the current highway-improvement program, many contractors are faced with the problem of keeping traffic moving through or alongside their construction jobs. This creates two problems of safety: the prevention of traffic accidents, and the protection of their own employees.

Robert W. Cleveland, of Robert W. Cleveland & Co., East Orange, N. J., described to the recent convention of the Greater New York Safety Council the measures his firm uses to solve these problems. This contractor recently completed work on two sections of heavily traveled U. S. 1 in New Jersey. This route is generally considered the world's busiest highway, and it was apparent, before any construction started, that the necessary safety measures must be planned carefully to avoid serious trouble with the traffic problem.

The Job Problem

In the modernization of this highway, the New Jersey State Highway Department started with a section approximately 3 miles long. Four contracts were awarded, of which the Cleveland firm held two, each approximately ¾ mile long, with about ½ mile between the sections. At the start of the operations, there was a single road for four lanes of traffic. The modernization plans called for the construction of a concrete highway for eight lanes of traffic, with the north and southbound traffic separated by a center island, and the through traffic in each direction separated from local traffic by a concrete curb.

One of the chief difficulties was to maintain four lanes of traffic without interruption. The existing highway was designed for 36,000 vehicles per day, and the average traffic was 60,000 vehicles a day. About 20 per cent of this traffic is comprised of heavy trucks and truck-trailers, carrying a large portion of the agricultural produce and dairy products for the New York Metropolitan area. The contractor was charged with the responsibility of maintaining this traffic continuously and safely. In addition, he had the responsibility of insuring the safety of his own employees working under these particularly hazardous conditions.

The Safety Measures

Before work started on the project, the Cleveland staff had many conferences with the New Jersey Highway Department engineers and with the Safety Engineer for the Fidelity & Casualty Co. of New York. These meetings were held to determine the measures which could be adopted to insure as far as possible safety both to the traveling public and to the firm's employees during the entire length of its operations. Mr. Cleveland reported a splendid spirit of cooperation and desire on the part of all concerned to help in solving this difficult problem.

As a result of these discussions, the contractor first placed several signs along the project, notifying the traveling public that construction was under way. Then 500 oil drums with white stripes painted around them for better visibility were placed along the edge of the pavement at about 10-foot intervals. These drums served as a real barricade along the entire project, but were readily removable at any place where temporary access was necessary. At night, kerosene torches were placed on some drums as a warning to traffic and as a protection to the work going on.

Before any hauling to the job was started, the Cleveland firm employed a former State Trooper as traffic supervisor. He made sure that operations were guarded at all times, and that the contractor's trucks entered the highway with the traffic flow and turned only at guarded locations. No vehicles were allowed to turn around in the road.

When it became necessary to switch traffic over from the old road to sections of the newly constructed highway, wooden barricades of a semi-permanent type were constructed. On these, electric lights with red bulbs were placed. The barricades were set at an angle to insure a steady flow of traffic rather than cause abrupt stops or turns.

First-aid and medical facilities were provided before the start of operations. Mr. Cleveland stated that this prevented small accidents and injuries from becoming serious.

Planning Paid

By means of this accident-prevention planning both before and during construction operations, the contractor was able to keep traffic flowing safely, with a minimum of inconvenience and delay, and serious accidents on the job were avoided.

Insure your own and America's future by purchasing U. S. Savings Bonds.

Lincoln Ups Boucher, Ford

A. F. Boucher has been named District Manager of the Milwaukee office of The Lincoln Electric Co. of Cleveland, Ohio. The Milwaukee office is located at 733 No. Van Buren St. At the same time, announcement is made of the appointment of Marshall Ford as District Manager of the Minneapolis office, located at 529 So. 7th St.

THE BYERS SEEDER

U.S. PATENT # 2076702—DISTRIBUTORS WANTED

Seeds, Rakes and Rolls in One Operation.

It will sow grass seed, commercial fertilizer, limestone or any granular material that can be broadcast on the surface of the ground and raked in.

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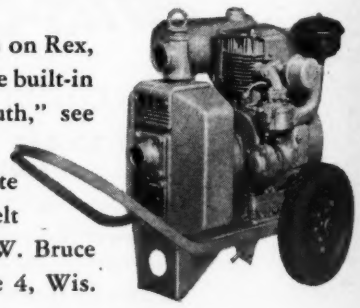
Clyde Ohio

"Reminds me of my Rex Pump!"

A Rex "Easy-Flow" Pump is always in the prime of life, thanks to its exclusive *adjustable* air peeler. For the priming efficiency of any self-priming pump is dependent upon its ability to peel air from the impeller. Rex assures top efficiency for the lifetime of the pump because Rex has the only peeler that can be adjusted to compensate for wear.

And, as a further aid to efficiency, Rex Pumps have a replaceable steel wearing plate that maintains the close tolerances between the side of the impeller and the volute so necessary for proper maintenance of vacuum. When wear takes place, the plate can be easily and inexpensively replaced, restoring original performance.



For all the facts on Rex, the pumps with the built-in "Fountain of Youth," see your local Rex Distributor or write direct to Chain Belt Company, 1666 W. Bruce Street, Milwaukee 4, Wis.

CHAIN BELT COMPANY *of* MILWAUKEE

REX CONSTRUCTION MACHINERY

Here is the new Le Roi Model 85 Airmaster compressor, on two pneumatic wheels. It features the Le Roi D201 engine, the Le Roi Econotrol, electric starting, and an electric hour meter. It is also available skid-mounted.

Compressor Mounted On Wheels or Skids

A new 85-cfm compressor has been added to its Airmaster line by the Le Roi Co., 1706 So. 68th St., Milwaukee 14, Wis. It can be furnished as Type E with rubber-tired mounting or as Type A on hard wood skids.

Power for the Model 85 Airmaster is furnished by a Le Roi D201 valve-in-head engine, which features replaceable cylinder sleeves, precision bearings, pressure lubrication, and magneto ignition.

The compressor is built integrally into the engine block and is liquid-cooled; it also has pressure lubrication, replaceable sleeves, and precision bearings. It is regulated by the Le Roi Econotrol which acts automatically according to the demand for air. Electric starting and an electric hour meter are supplied as standard equipment.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 31.

Electric Generators

A new line of light weight portable electric generators has been introduced by D. W. Onan & Sons, Inc., 39-51 Royalston Ave., Minneapolis 5, Minn. This line was designed to reduce weight per kilowatt and improve compactness. It uses the Onan CK gasoline engines as prime movers.

The CK generators are available as 60 or 50-cycle ac units with capacities of 2,000 or 3,000 watts; as 5,000-watt dc units; and as 3,500-watt battery chargers. They are available in stationary as well as portable models, with either manual or electric starting.

By means of a special winding, the plant's generator serves as the cranking motor during the starting cycle. A 12-volt automotive-type battery furnishes the starting power.

Special accessories include automatic controls, line-transfer controls, dollies, gas-gasoline carburetion, and underground fuel tanks.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 40.

Bulletin Boards Are Safety-Program Aid

An important center of any safety campaign is the bulletin board, with its reminders of standard safe practices; of hazards likely to be encountered on the work for that day; of the safety record for the project. The board also gives news of work progress, messages of general interest to the entire crew, notices of meetings, etc.

One company making bulletin boards for these purposes is the Industrial Products Co., 2914 No. 4th St., Philadelphia 33, Pa. Ipco boards are equipped with Lumiline lighting which shines through the top panel and illuminates the message. The mounting board is removable and reversible. The reverse side is enameled black so that it may be used as a blackboard for special notices.

The Ipco boards are made of kiln-dried lumber and are spray-finished in dark-green enamel. The glass door is equipped with a lock. The model No. 80 single-unit board is 28 x 35 inches, and it has a 4-inch depth. The Model No. 81 is equivalent to two of the No. 80's. It has a double door opening in the center. Boards of special sizes or with specially worded panels are custom-built to order.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 38.

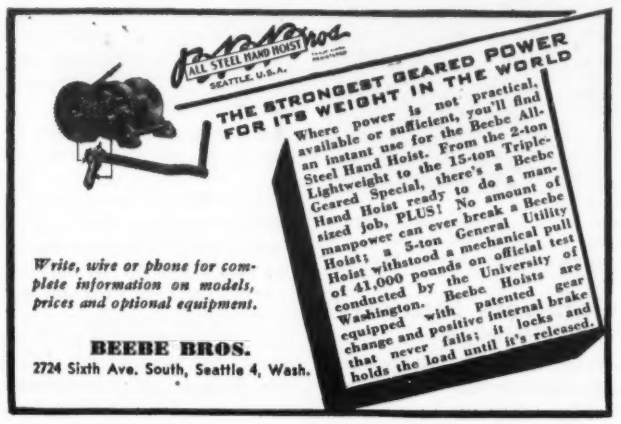
Earth-Moving Wagons

A clamshell-bucket-type wagon and tractor is the subject of a folder obtainable from the Dixson Mfg. Corp., 2623 Oak St., Kansas City 8, Mo. This 16-cubic-yard dirt hauler is designed for high-speed earth-moving.

Two tractors are available for use with this unit, and both are illustrated and described in the folder. The Model No. 140 is a single-rear-axle unit, and the Model No. 250 has a tandem-drive axle. Both are mounted on pneumatic tires.

Controlled spreading, high-speed operations, and features of safety and design are all discussed in detail. One page of the folder is devoted to a discussion and list of specifications for the clamshell wagon.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 56.


ALL STEEL HAND HOIST
SEATTLE, U.S.A.
THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD
Where power is not practical, or sufficient, you'll find available or sufficient, you'll find an instant use for the Beebe All-Steel Hand Hoist. From the 2-ton Lightweight to the 15-ton Triple-Geared Special, there's a Beebe Hand Hoist ready to do a man-sized job, PLUS! No amount of manpower can ever break a Beebe Hoist; a 5-ton General Utility Hoist withstood a mechanical pull of 41,000 pounds on official test conducted by the University of Washington. Beebe Hoists are equipped with patented gear change and positive internal brake that never fails; it locks and holds the load until it's released.
Write, wire or phone for complete information on models, prices and optional equipment.
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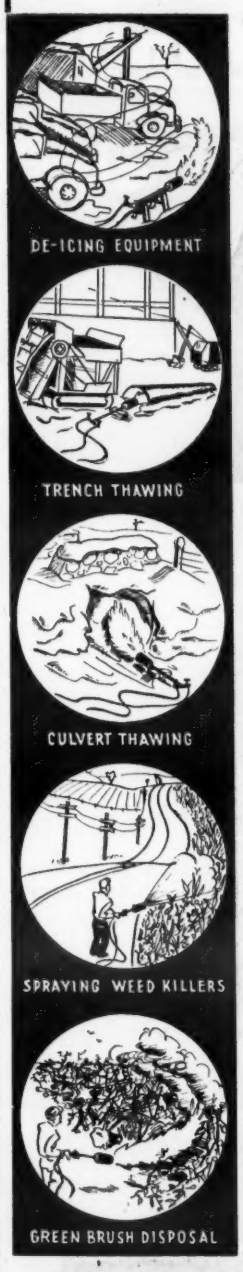
DOWEL ALIGNMENT BEING CHECKED BY SPIRIT LEVEL

HIGHWAY DEPARTMENTS REQUIRE DOWEL ALIGNMENT CHECKED BEFORE CONCRETE PLACING.
LACLEDE DOWEL SPACERS ALIGN DOWELS HORIZONTALLY, AND VERTICALLY ON ALL TYPES OF SUBGRADES AND MAINTAINS EXACT ALIGNMENT DURING CONCRETE POURING.
ELIMINATE COSTLY FIELD ADJUSTMENTS—USE LACLEDE DOWEL SPACERS.

LACLEDE STEEL COMPANY
ST. LOUIS, MISSOURI



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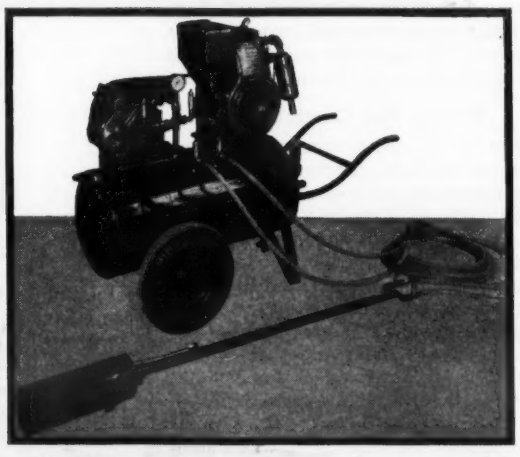
Fire and Temperature to melt steel—25% more volume than your Asphalt Booster; or smaller fire to match any requirement.

VERSATILE—Summer, Winter, Fall and Spring—Utility limited only by ingenuity of the man on the job.

HEAT AND FIRE FOR—Asphalt patching; Frost boil repair; OA-30 Underseal; Green brush, weed and stump disposal; Weed control; Paint removal; Protective heat on building construction.

THAWING, DE-FROSTING, DE-ICING—Equipment; Ground for excavating, trenching; Coal, oil or aggregates in cars; Clearing lines, pumps and other asphalt handling equipment; Culverts, frogs and switches.



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Pressure Atomization Type Oil Burner. Burns No. 3 fuel. No Generator Coil. No waiting. Full manual modulation—4 to 24 gallons per hour. Eighty Horsepower at nozzle—2600° to 2700°.

Ask your Distributor or Write for full information.

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MILWAUKEE WISCONSIN

C. & E. M. Photo
This view looking west towards the end of the Weber contract shows workmen cleaning, aligning, and staking forms.

New Concrete Runway

(*Continued from page* 1)

fore Fred Weber knew his problem was not so much whether the digging was hard, but rather, how to handle dirt that was too soft. High up above the surrounding river plain, at the top of one of the first cuts, the machines struck a layer of mushy sand 30 inches thick.

"If we'd hit it somewhere down close to the Mississippi River, we'd have called it quicksand," Weber explained.

"We had to use our pusher cat to pull equipment out. The only way we succeeded in handling this tricky stuff was to mix it as much as possible with drier dirt. That way we could work it into some of the fills."

Dirt hauls generally averaged 1,200 feet one way. The DW10's rounded out their first full year of working life early during the job, with minor operating repairs.

Though the City's specifications allowed the contractor to place the dirt in 10-inch lifts, Weber used extra precaution and bladed in the lifts much thinner to get the best possible densities. Dirt never went in more than 6 inches thick. Mindful that heavy paving and finishing machinery would rest on forms supported by this same subgrade, Weber used a little extra care to make sure it was stable.

Runway embankments were not extensive. For the most part, the very heavy grading through a 30-foot hill was carried ahead towards the east end and deposited in line with future extensions.

Because of heavy airplane traffic, the work had to be done in four sections. Fortunately, the area in which most of the yardage had to be dug and hauled coincided with the lightest air traffic. Near existing runways, however, flagmen and operators used extreme caution even though their machines were not crossing any of the intersections.

Paving Not Continuous

Because of these runway intersections and a delay in awarding a 1,000-foot extension, the operating method on paving had to include four parts for the main 5,100-foot runway under the contract. A section 1,400 feet long was poured first, and was better than half completed when CONTRACTORS AND ENGINEERS MONTHLY's Western Editor visited the work. Following that came a piece 800 feet long, which finished the new runway through a present three-way intersection. By then, the grading on a section 1,900 feet long was scheduled to be finished and ready for the paving machines. Subsequently, 1,000 feet was added as an extension to the contract to wind up the main runway.

In any section, paving begins on the 25-foot lane just north of the center line of the runway. The first lane south is then poured adjacent to the one just completed. The paving equipment then moves back to the north side, working always on the subgrade, until it finishes a section with the last lanes of the outside of the runway.

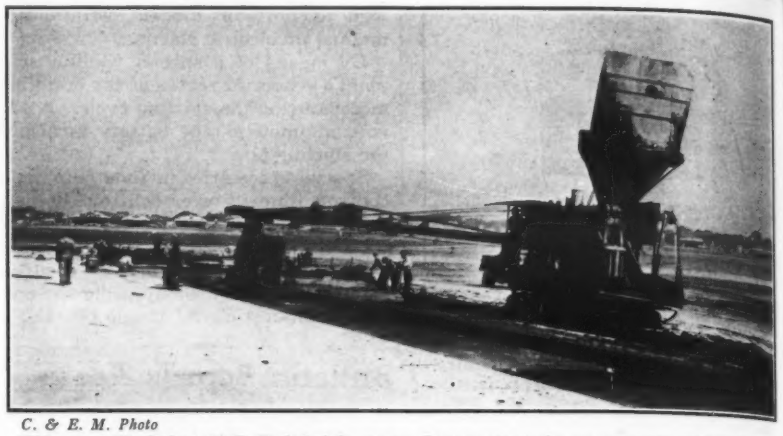
Form Work and Fine-Grading

A 3,200-foot set of new Blaw-Knox 12-inch forms, with a 12-inch base, was brought in. It is the first job for the new forms. They are set down in a form trench excavated by a Cleveland form-grader.

A crew of 1 foreman, 2 equipment operators, and 15 laborers sets, aligns, and stakes forms, prepares the subgrade, does fine grading, and moves forms ahead. The forms are set about 900 feet ahead of the paver, with 25 feet between the lanes.

A Cleveland subgrader is used for fine-grade work, assisted at times by one of the motor graders and a Trax-cavator. Excess earth is dumped outside the forms in any case, and a Cleveland form tamper stabilizes the earth under the forms to prevent bad voids.

After the forms are set and checked, they are staked down by steel pins. After the subgrading machines do their work, the elevation is checked by stretching a tight line between the tops of the steel forms and measuring down to insure full depth to the ground.



C. & E. M. Photo
This new Koehring 34-E Twinbatch paver dumps concrete on runway subgrade as finishing machines work in the background on the Lambert airport job. The paver has a dual-gate bottom-dump bucket and a 35-foot boom.

There is some 13-inch concrete at the ends of the new runway and on the new taxiways. The subgrade is cut an inch deeper than the bottom of the forms for this work, and the 12-inch forms are used the same as on 12-inch concrete.

A wood keyway form is bolted onto

(*Continued on next page*)

Save dollars by

standardizing on CP

contractors' equipment

Designed for one-man operation, and fast drilling with the more powerful CP drifter drills, the G-200R lightweight Wagon Drill will drill holes at any angle. With its three roller-bearing rubber-tired wheels it can be moved with speed and ease, even over rough ground.

C. & E. M. Photo
This view of Lambert Airport work shows the new Blaw-Knox batching plant set up for the Weber Contract.

the sides of the steel forms to make a joint on the multiple lanes. The two outer strips require dowel bars, and the keys for these are formed with metal strips bolted on in the same way. The dowel ends can be bent down and concealed under these metal forms.

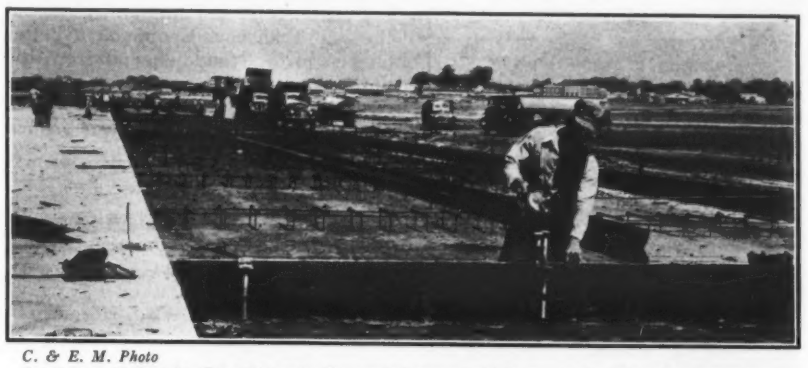
Construction, Expansion Joints

Considerable work is needed to place all the materials designed to take care of slippage, expansion, and contraction. A metal strip, pinned to the subgrade, is placed ahead of paving along the center of each strip. The top of the metal comes ½ inch below the top of concrete, making a hairline plane of weakness.

Expansion joints, at 120-foot centers, are made of cork 11½ and 12½ inches deep, ½ inch thick, and 12½ feet long. The top of this cork is ½ inch below the concrete; the crack is filled with Keystone joint-sealing compound. The cork strips are held in place during the pour by a metal form in two sections, securely staked to the subgrade.

A set of 24 1-inch round steel dowel bars, 6 inches up from the subgrade and on 6-inch centers, was installed to help take the load transfer at these joints. They are carried on a steel framework supported on steel chairs, with alternate ends greased and capped.

A set of the same dowel pins is placed in the same way on 20-foot centers for the contraction joints. The top of these joints is formed by a steel wedge after the concrete is poured, and 3 x ⅜-inch strips of Keystone asphalt mastic board are inserted just ahead of final finishing.



C. & E. M. Photo
A worker stakes to the subgrade the metal form which supports the cork expansion-joint strips during the pour on the new Lambert Airport runway.

Batch-Plant Set-Up Unusual

One of the most efficiently set-up batching plants ever seen in the midwest is serving dry-batched material to the paver. It consists of a new Blaw-Knox 100-ton aggregate bin with the latest weighing hopper, and a 300-barrel Blaw-Knox bulk-cement bin. Both bins are in line with each other and only about 30 feet apart. They are connected by a timber walkway, and the inspector can walk from one weighing platform to the other with ease.

Bulk cement comes in from the south end of St. Louis County, and is dumped by hopper cars to the feeder of a 300-barrel Heltzel cement silo at the railroad siding about a mile from the job plants. A specially equipped Autocar, with its dump body raised and covered with corrugated aluminum, transfers cement to the Blaw-Knox plant. A ramp was built up to permit the Autocar to dump 15-ton loads directly to the screw conveyor of the Blaw-Knox plant. Alpha portland cement is being used.

Sand is furnished under a subcontract by the St. Charles Sand Co., and rock under a similar arrangement by West Lake Quarries. A fleet of 20 of their dump trucks is constantly busy pouring in material over a 4-mile haul. On good days, 1,000 tons of aggregate and 600 tons of sand are hauled in and dumped by these trucks.

The material is rehandled to the plant bins by a 2½-cubic-yard Owen rehandling bucket, carried on the 60-foot boom of a Lorain 2½-yard crane. Two ¼-cubic-yard batches are weighed out simultaneously, and dumped the same way to a 7-unit fleet of batch trucks, mostly Fords and Internationals. The batch trucks drive through under both plants with only a very short distance from aggregate to cement plant. Rock aggregate goes in the weigh hoppers first, then sand, and bulk cement is added to the trucks last.

Mixing the Concrete

The batch trucks discharge their materials to the skip of a new Koehring 34-E Twinbatch paver, equipped with a dual-gate bottom-dump bucket and a 35-foot boom. Materials clear the skip each time it comes up because it is designed to empty itself, and a cable-anchored weight can be banged against the skip to make sure.

Mixing water is hauled by two 2,000-gallon tank trailers from a water main on the southeast corner of the field. As a trailer is standing by to be emptied by the pump on the paver, another is being filled by the truck. The paver carries only about 200 feet of flexible hose. Mixing time is 45 seconds per drum, and the concrete is turned out at about a 2-inch slump.

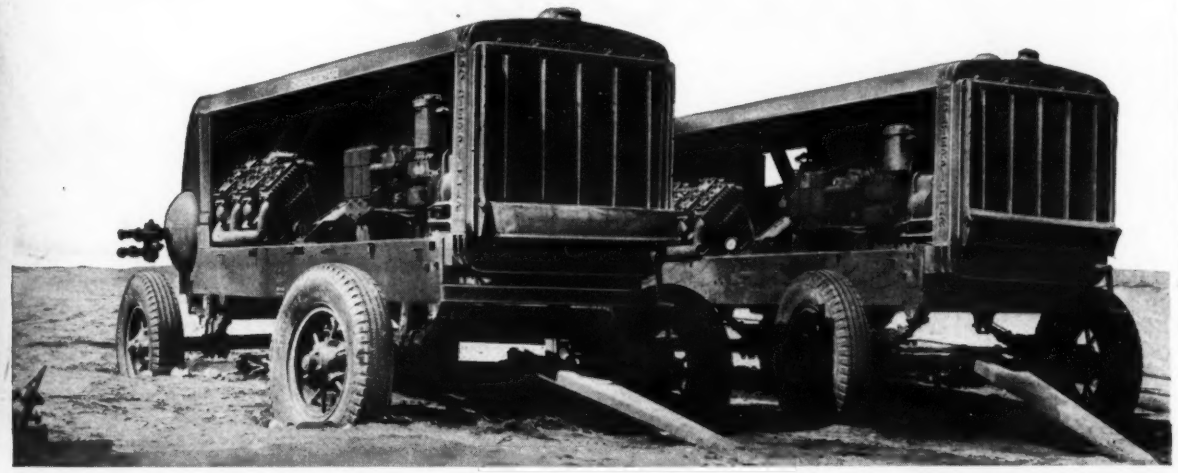
In dumping the material, buckets of concrete are placed first against the sides of the pour, next the center metal joint is bracketed and the concrete worked in against it, and then the open area in between these dumps is filled. Forward movement of the string of paving equipment is very rapid, however, and the men are usually hard-pressed to keep up. The 930-foot pour represented the placing of 860 cubic yards.

The concrete coming from the paver has the following amount of material

(Concluded on next page)

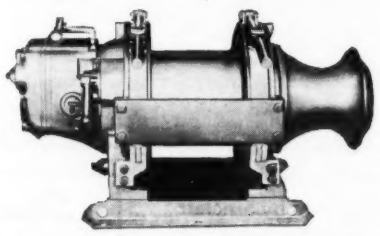
If you have used CP equipment – rock drills or portable compressors, for example – you know they are efficient and dependable because of their superior design and rugged construction. You will find these features characteristic of the complete line of Chicago Pneumatic contractors' equipment.

Another reason why many contractors standardize on CP equipment is CP's coast-to-coast distribution and service facilities.



You can count on fuel savings of 15% to 35% with a CP Portable Compressor, with its economical engine and gradual speed regulator. Illustrated is the CP-500 Portable. Chicago Pneumatic gasoline driven compressors range from 60 to 315 c.f.m.; Diesel-driven models from 105 to 500 c.f.m.

For grout hole drilling, the CP No. 5 Diamond Drill is ideal because of its speed, light weight, great power, air economy, and ease of handling.



Air-powered CP Winch equipped with cathead for increased versatility of operation.

CP Utility Winches, powered by air, electric or gasoline motors, are adapted for single line or multiple line hoisting, spotting cars, moving timbers, handling structural steel, erecting machinery and boilers — and for scores of other jobs where accurate spotting and control of load is essential.

CP-4 ring valve Backfill Tamper is designed for efficient handling of extra heavy work, such as tamping in earth dams. Bore 2¼"; stroke 6"; weight 42 pounds.

CHICAGO PNEUMATIC TOOL COMPANY
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ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

C. & E. M. Photo
Excavation boss Les Gephardt, left, gets the day's orders from Contractor Fred Weber, who is personally looking after the Lambert Airport job.

New Concrete Runway

(Continued from preceding page)

in each batch:

Cement	711 lbs.
Sand	1,767 lbs.
Aggregate	2,317 lbs.
Water	36 gals.

The high rate of paving can be directly attributed to the efficient batch-plant set-up, new equipment, and to the interest of key foremen who have worked long and hard for Fred Weber, according to Weber himself.

Working and Finishing Concrete

As soon as the concrete hits the subgrade, it is spread and distributed evenly between the form lines by a Blaw-Knox concrete-finishing machine. Two Jackson electric vibrators on the back of the frame of this machine supplement a transverse vibrator and vibrate the concrete along the form edges, insuring a smooth-stripping face. The operator backs this machine up and repeats the pass to work the concrete down as dense as possible.

Following the spreader is a new Koehring Longitudinal Finisher, with double finishing screeds. Two men working on each side of this machine make sure the concrete is puddled and that any depressions are left filled. This machine also makes several passes if it is necessary, and leaves the surface of the concrete finished off even with the top of forms.

The bridge which is used to cut the contraction-joint slots is close behind, however, and the Keystone asphaltic joint material is set in place before the concrete gets its final finish. Concrete finishers who use wood bullfloats, steel float bars, and small edging tools then follow this work. The final finish is a herringbone effect put on by two men manipulating a 6-inch belt. Dressing with ½-inch-radius edging tools along the form lines is done last.

When the new concrete has taken its initial set, but before any hair checking has appeared, the surface is sprayed with Kapco concrete-curing compound and left to cure. There will be very little vehicular traffic, if any, on the concrete until it has cured for several weeks. Aside from the automobiles used by foremen, the superintendent, and a few city representatives, there is little need for vehicles.

Forms are stripped 24 hours after the pours are finished. Form pins are pulled by a Cleveland pin extractor; the forms are cleaned off by steel hoes and moved ahead by truck. In general, the previous day's run is stripped and all the forms re-set before the work is considered complete for that day.

Some bituminous work is called for in the contract plans. Where Weber's work intersects existing bituminous runways, all transitions will be put in with the same material. Operations early this year were aimed at completing as much of the concrete work as possible while an unusually severe rainy season was in progress.

Completion of this first 5,100 feet of the new east-west runway will give the big commercial airliners and planes of the Air Transport Command a better chance to land and take off from the field. The grading, especially, will reduce high ground to the point where pilots will like Lambert Airport much better.

Personnel

The present contract plans were designed and are being administered under the supervision of Guy Brown, Chief Engineer, Sewers and Paving, of the City of St. Louis. H. J. Horan, Assistant Chief Engineer, is in charge of construction, with Jack Powers as Resident Engineer for the City.

On-the-job officials for the contractor include Fred Weber, who is personally looking after the job. His son, Fred Weber, Jr., is Project Superintendent. Roy Nyfeler is the Concrete Foreman, Les Gephardt is in charge of grading, and Fred Sauer and Gus Stahlhut share honors for the form work and subgrading. Ollie Luntzer is the Master Mechanic.

High Discharge
TRANSPORT TRUCK MIXER

- Fast open top charging
- Full view inspection
- Superior mixing assures quality concrete
- Good delivery
- All steel construction
- All bearings fully protected for low maintenance

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CONCRETE TRANSPORT MIXER CO., Inc.
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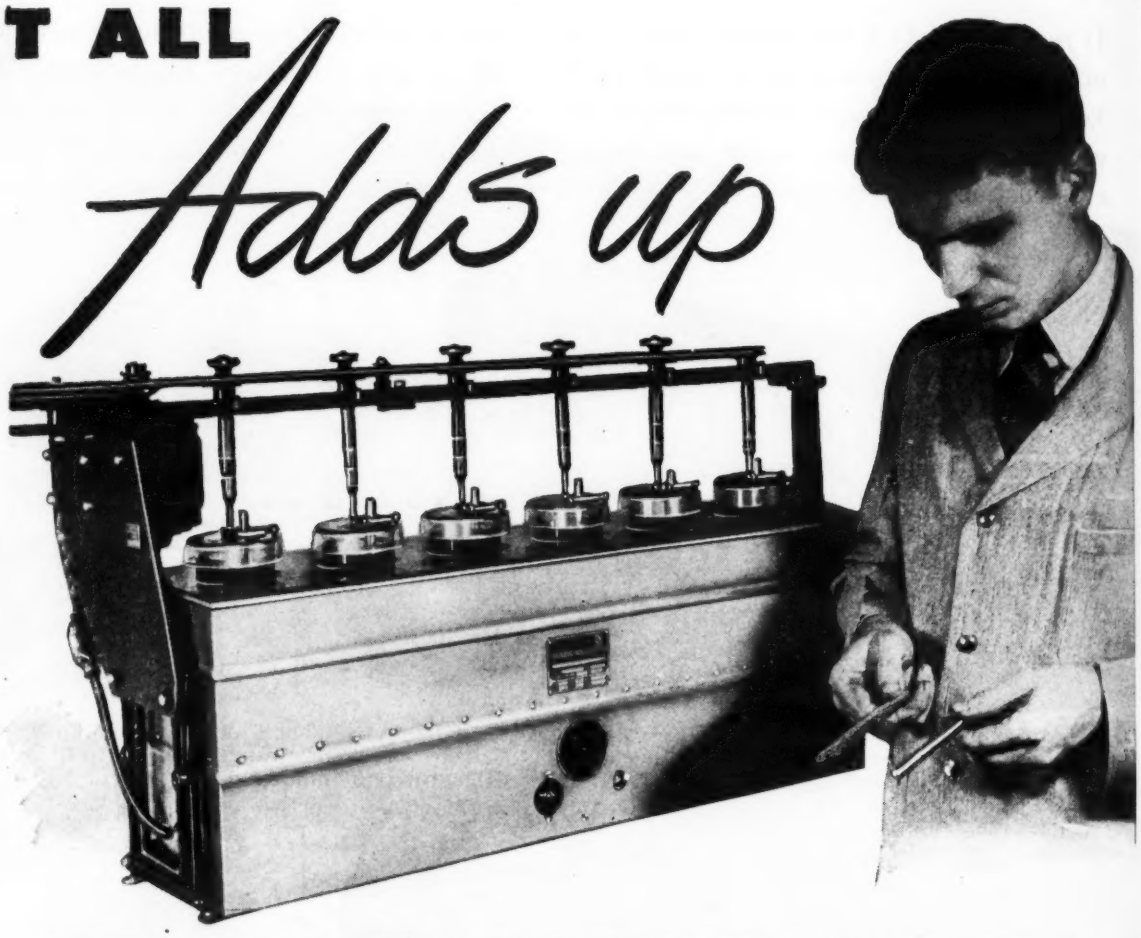
IT ALL *Adds up*



Where special qualities are essential for safe, enduring industrial lubrication, Sinclair Research develops additives that will "further improve the best".

Pictured above is one apparatus used by Sinclair Research to determine the rust-inhibiting efficiency of oils manufactured for turbine use. Chemical additives are studied to provide such protection against rust. Obviously, the treated oil sample used on the metal rod in the technician's left hand has high rust-inhibiting efficiency and prevented the deposit shown on the other rod.

All Sinclair Research and Refinery Control is similarly thorough. *It all adds up* . . . to assure you of lubricant qualities essential to efficient and economical industrial maintenance in all applications.

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For Bus, Truck and Tractor
OPALINE
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Superior lubrication in the long pull, under heavy loads
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Keeps engines clean . . .
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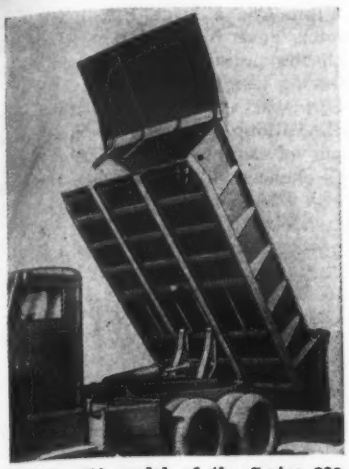
FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE



The No. 354 model of the Series 300 dump bodies with the No. 827 Iso-Draulic Roll-A-Lift hoist is shown here mounted on a truck.

Bodies and Hoists For Dump-Truck Use

A new line of dump-truck bodies and hoists has been announced by The Perfection Steel Body Co., Galion, Ohio. This 300 series of bodies is made in capacities varying from 2 to 12 cubic yards. Sizes range up to 7 feet in width and 12 feet in length, with the dimensions increasing in 6-inch increments. Special sizes are built to order.

The manufacturer states that these bodies are made of 8-gage high-resistant sheet steel, heavily braced at all points of stress. The body understructure is of 4-inch I-beam cross bolsters and 5-inch I-beam longitudinal sills, all securely welded together and welded to the body.

The No. 827 Iso-Draulic Roll-A-Lift hoist is designed for use with these heavy-duty bodies. The upper surfaces of the two lift arms engage two pressure rollers mounted on the body. The design is such that, at the beginning of the stroke, where the lift is heaviest, the greatest leverage is provided. Two keeper-rollers travel along the underside of the lift-arm flanges, to keep the pressure rollers in constant contact with the arms, regardless of body position. These hoists are available in a number of sizes, suitable for use with the varying sizes of truck bodies.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 13.

Chargers and Testers For Battery Upkeep

A line of battery chargers and testers for use in highway department and contractors' equipment shops is made by the Baldor Electric Co., Apparatus Dept., 4357 Duncan Ave., St. Louis 10, Mo. There are several models to choose from, varying in size from a small portable unit to the large garage-type models.

The portable Handifast charger operates on 115-v ac, draws less than 10 amps, and charges at a variable rate up to 80 amps. An automatic device will time the duration of charge up to one hour. A D'Arsonval meter indicates the condition of the battery and the charging rate. The unit has an aluminum carrying handle and weighs 46 pounds.

The Baldor Model No. F-4 can be used for charging one to four batteries at a time, at a rate of 6 amps or less. Charging rate is adjusted by a control dial mounted on the panel. The Model No. F-12 Handy charger will handle from one to twelve batteries at a charging rate of from 2 to 6 amps. The Models No. F12-24 and F6-12 are designed for the operator who wants to charge some batteries at one rate and others at a different rate on one machine.

The Model No. C-80 features a voltage relay control. It is said that this control will automatically cut or regulate the fast charging rate according to the internal condition of the battery being charged. Charging rate is adjustable up to 80 amps.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 16.

Data on Table-Mounted Saw

A catalog describing its table-mounted saw can be furnished by the Maquoketa Co., Maquoketa, Iowa. The Timber City Woodworker can be used for many sawing and wood-cutting operations.

The catalog shows this electrically powered saw in use for cross-cutting, ripping, mitering, and bevel mitering. In addition, there are drawings which show how it can be used for dadoing, ploughing, rabbeting or grooving, shaping, routing, or for making tenon joints. Specifications are listed on the back of the folder.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 71.

Scientific Tests Prove...
EVEN PRESSURE—UNIFORM TEMPERATURE ALONG ENTIRE 24 FOOT BAR!

With precision instruments in this exhaustive test pictured on this page, we prove that with a *STANDARD STEEL WORKS' Spray bar*—YOU will get exactly the same pressure over every inch of the bar, and temperature is unvarying right to the extreme tips of the bar!!!

This Scientific Spray Bar Test was made at 40° Fahrenheit, outside temperature. Six pressure gauges were placed along the entire 24' length, full circulating spray bar. A pencil-type thermometer was located at each end of the bar. *STANDARD STEEL WORKS' Full Circulating Spray Bar* on discharge, produced 28 lbs. even pressure at each gauge across the entire 24' length of bar. Temperature gauges indicated 350° Fahrenheit. The temperature dropped between the tank and the spray bar, exactly 4°.

85-100 PENETRATION *(Heavy Oil)*
STANDARD STEEL DISTRIBUTOR

OPERATION	GAUGES 1	2	3	4	5	6	ENG. R.P.M.	TEMPERATURE LEFT END	RIGHT END
SPRAY	28	28	28	28	28	28	300	350°f	350°f
"BEST COMPETITIVE MAKE"									
SPRAY	37	35	42	41	43	43	300	290°f	280°f

The chart at the left indicates the exact pressure at each pressure gauge, along the entire 24' length of spray bar. 85-100 penetration asphalt was used in making this test. The competitive machine, identified in this chart as make "A", under identical conditions, had a pressure variation of 8 lbs., and a *drop in temperature of 64°* at one end and a drop of 74° at the other end of bar.

The STANDARD STEEL WORKS' Model 424 Pressure Distributor with *Full Circulating Spray Bar* offers the CONTRACTOR, ENGINEER, and OPERATOR, *fast, accurate application—no delays due to frozen spray bar sections—no lean or fat spots* to give trouble. *Uniform pressure throughout* the *entire spray bar*—absolutely assures even application of material on the road bed. *Job always completed on time.*

Built to the Highest Standard

Standard Steel Works
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MAIL COUPON TODAY FOR COMPLETE DETAILS

Gentlemen: Send me at once, your complete catalog and test data on the Model 424 Pressure Distributor, as shown in Catalog 6145.

Company_____
Name_____
Title_____
Address_____
City_____ State_____

Portrait in Print

By BILL QUIRK

Contractors Now More Safety-Minded According to Veteran Superintendent

✦ "WE don't get better men today on construction jobs than we had a generation or two ago, but they are looked after with more regard for their health and safety than ever in the past." This conclusion was expressed by George A. Malarkey, veteran Superintendent for the John F. Casey Co., a big Pittsburgh contracting firm, as he discussed job safety on the large Elkins, W. Va., flood-control project which his company is constructing.

"Jobs are safer today because of governmental regulations, the suggestions and advice from safety committees, and the widespread adoption of a safety-minded attitude on the part of most contractors," Malarkey continued. "It is not so long ago that the average superintendent was a slave driver, forcing his men to work under conditions which were extremely hazardous to human life. But that has all been changed. Workers are probably still as careless as ever, but now they are more intelligently supervised and thus kept out of a lot of trouble."

Malarkey knows whereof he speaks. While still in his teens he was an ironworker building bridges around Pittsburgh. Now at 62, a dean among active construction superintendents, he has a broad background from which to draw comparisons between the present and the past.

It is something of a surprise to encounter Malarkey for the first time when he is supervising a large project, and find him wearing a black derby hat. He has not, however, just come on the job from some social duties in the city, and lacked time to change his clothes. Nor is he about to rush off for a stroll along the boulevard. Derbys are his usual headgear and he has been wearing them since he was a very young man. Besides the one on his head, another hangs on a nail in his construction office for rainy-day use. The sobriquet "Hard Hat Malarkey" by which he is known is a natural.

Derby for Safety

"The derby has saved my head many a bump," Malarkey acknowledged. "It used to be the hallmark of a contractor's superintendent, though I guess I'm about the only one who still wears one on the job. Many a falling object has dented the derby but not my skull. I've found it useful too in crawling about under machinery and equipment as a sort of feeler for low clearances. I should kick myself, though, for not having thought of applying its principle to protective headgear in general, such as that now used by miners and construction workers. I would have cleaned up.

"I can't get away from the derby even when off the job. My daughters like it and make me wear one—not this cement-spotted model, of course, but a shiny bowler with a satin band."

Malarkey is partial to his nine daughters, probably because they constitute a majority. He has three sons. He carries an extra billfold in his pocket to provide room for all their pictures and those of twenty-two grandchildren, at the latest count. Even with twelve offspring (one daughter died), Malarkey did not quite equal his father's record of fourteen. George was the youngest of seven boys and seven girls who lived on Pittsburgh's Fifth Avenue where the elder Malarkey ran a saloon.

Baseball Pitcher

Despite such a large number of boys, the Malarkey parents, of sound Irish stock, had not contributed a single son to the priesthood, much to their regret. Accordingly, when George was ready for high school he was sent to St. Vincent's Preparatory at Latrobe, Pa., where, the elder Malarkeys hoped, he might acquire a vocation. But young George was athletically inclined, and under the good fathers' development he acquired a fast-breaking curve ball, a spitter with a sharp hop to it—but no vocation. He remained at St. Vincent's for four years and became a star pitcher on the prep-school nine.

He was then good enough to be signed by the Youngstown, Ohio, team of the old Ohio State League. Youngstown is only 70 miles from Pittsburgh, so George, during off hours from baseball, had time and opportunity to fall in love with a Pittsburgh colleen. Things went along smoothly until he was purchased by the Lima, Ohio, club. This did not set so well with the young hurler, for Lima was over 250 miles from home and sweetheart. He gave up a promising career as a pitcher and looked around for a job in Pittsburgh so that he could get married.

The family saloon on Fifth Avenue had been sold, so he could not go to work there. Three older brothers had become ironworkers in the construction industry so George became one too. He also got married while still only 19. Enough steel was going up around Pittsburgh in that first decade after the turn of the century to give ironworkers and erectors plenty to do. Malarkey and his brothers built bridges, buildings, and all types of structures in the days when human life was held cheap.

Becomes Ironworker

"At that time," Malarkey reminisced, "lives were lost on practically every job of any size. I remember one out-of-town bridge job my brothers and I were told to report to. We were delayed en route and showed up a day late. Shortly before we arrived fifteen ironworkers were killed when a span fell. Another time I had just stepped off a traveler that tipped over killing six. Faulty anchoring, I believe."

After Malarkey took a couple of bad falls himself he decided to see if there wasn't a safer if not perhaps an easier way to earn a living. Heavy construction was what he knew best, and Booth & Flinn Co., a large Pittsburgh contractor, gave him a job. He started with the prosaic yet responsible task of hiring teams.

Dirt was then moved with horses pulling dump wagons or boxes—crude forms of early scrapers. A contractor's chances of success were about as

(Continued on next page)

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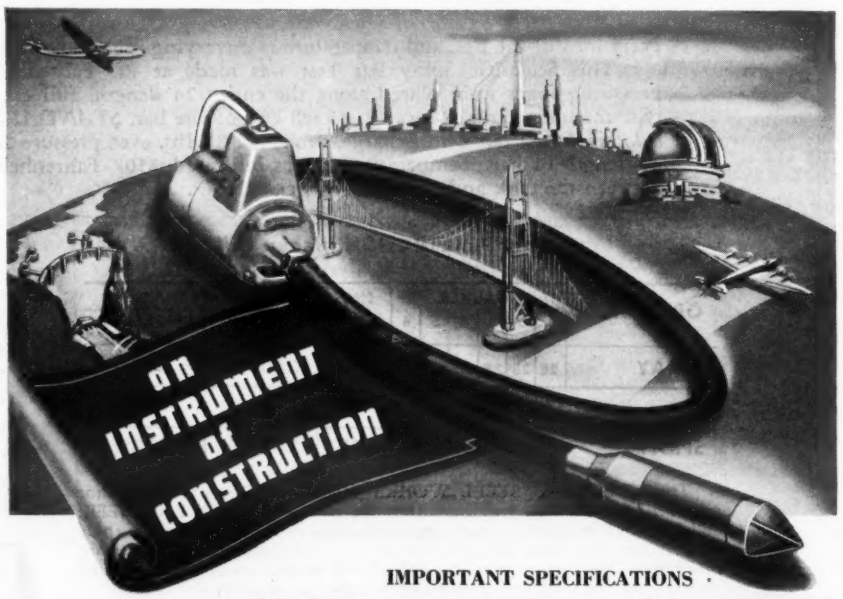

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To obtain maximum density and strength in concrete, it is important that the entire mix be given internal high speed vibration. This reduces voids, honeycombs, shrinking and cracking, also placing and compaction time. Built to withstand the strain on heavy construction jobs, the VIBER Vibrator makes practical the use of drier mixes. The interchangeability of VIBER units permits quick conversion to changing job conditions, eliminating delays, and the light weight portability offers easy one-man operation.

Important facts and specifications on VIBER Vibrators furnished upon request.

IMPORTANT SPECIFICATIONS

Optional electric, pneumatic or gasoline motor . . . flexible casing fabricated from multiple laminations of high tensile strength wire braid, spirally wound fabric, covered with tough, live rubber . . . interchangeable flexible cores of high quality steel . . . Vibrators made from heat treated alloy steel with hardened outside surface (weight assemblies mounted on ball bearings) . . . motor bearings sealed and packed with lubricant at factory, need no further lubrication; weight assemblies mounted on open type, single row, radial bearings; and splash system oil-bath lubricates the bearings and dissipates the heat . . . an instrument of quality and durability.

VIBER COMPANY EST. 1931

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good as the horses he used. Consequently they were either purchased or rented with extreme care. Malarkey became a shrewd handler of horse flesh and drove a tough bargain. No one put anything over on the converted ironworker and probably never will.

Some years ago while he was driving at night over a particularly rough grade crossing badly in need of maintenance attention, the rear wheels of Malarkey's car dropped into a hole alongside the track. While he was trying to get out, the spinning wheels only made the hole deeper. With a train approaching, Malarkey leaped from the car and lit a newspaper to flag down the train, but in vain. He was safe but the car was wrecked.

Bright and early the next morning Malarkey took some pictures of the hole at the crossing. A little later the railroad company sent out a repair crew, filled in the hole, and took some pictures of the smoothed-over job. Came the inevitable lawsuit and trial and the railroad's surprise that Malarkey had been there first with his camera. Result? Malarkey soon had a new car.

Becomes Superintendent

In 1911 Malarkey went to work for John F. Casey of Pittsburgh, who was then in the contracting business with a Philadelphia partner, Ottomore Stangey. With his well rounded background of experience, Malarkey soon became a superintendent. But his personal problems were increasing with the growth of his family. Babies need new shoes and other things. Thoughts of the wonderful saloon on Fifth Avenue, with its bounteous return in life's necessities, conjured up in George the dream of becoming a saloon keeper. He would leave construction and have a business of his own as his father had had.

John F. Casey did not relish losing a good superintendent. He wanted Malarkey enough to subsidize the growing family. As each new Malarkey entered the world, he gave George $1,000 and congratulations. In return he got a cigar and Malarkey's continued services as superintendent.

Despite the abundance of young Malarkeys, Casey apparently did not regret the precedent he established. In 1918 he bought out his partner and took ten of his employees into the firm, incorporating it as the John F. Casey Co. Of the ten, only Malarkey and S. L. Fuller are still living. Fuller, a former superintendent, is now President of the company, while Casey's two sons, John F., Jr., and Samuel, are Vice Presidents.

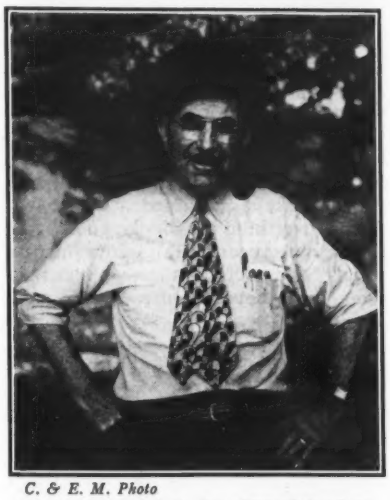
While John F. Casey, Senior, now 75, has retired from active participation in the work of the company, he keeps fully informed on its operations. "He used to meet me on the job every morning at 6 o'clock," said Malarkey. "He is one of the finest men that ever lived, and got his start in a very humble way on long hours and hard work."

Back in 1922 when Casey was 50 years old, a testimonial banquet at which 50 of his employees were present was held in his honor. Irish oratory kept pace with the toasts that were drunk to the health and well-being of Casey. All had spoken but Malarkey who had never been noted for his reticence. Finally Casey, noting that George had contributed nothing in the way of a speech, said, "George, will you stand up and say a few words?"

At that time Malarkey was supervising a big railroad job for the company, unloading and placing on a fill 150 carloads of slag every day, week after week, month after month—the same deadly monotonous routine, with the stream of cars from the steel mills never slackening to give the men a breather. George arose, paid due compliment to the job the men under him were doing, and then as though hopelessly trapped in a mountain of slag he turned to Casey and roared, "If you aren't a blankety-blank millionaire by this time, just give us more slag and we'll make you one."

Sticks by Men

While his rough yet picturesque speech would shock old ladies if they were within earshot, Malarkey offends no one because of an engaging smile and charm of manner that takes the barb from many a sharp retort. He drives his men hard, but himself even harder, and inspires loyalty in all his workers. In return he never lets them down even under unusual circumstances.



C. & E. M. Photo

Don't be misled by Superintendent George A. Malarkey's black derby. It's his usual job headgear and it's saved his skull many a dent, he says.

On one job where he was General Superintendent, he had a grading superintendent who was all that a contractor could ask for. His only failing, if it be that, was getting married while he already had a wife. The sheriff finally caught up with the bigamist, but as George had already cultivated a firm friendship with the sheriff he got the tip-off first. He transferred his errant superintendent hastily to a job in another county and everyone was satisfied except, that is, a couple of protesting women.

While not exactly the reforming type, Malarkey on one occasion did some soul saving. This time the job was a street pavement in Pittsburgh with trolley tracks down the middle. His heretofore-responsible foreman was causing him trouble by disappearing

(Concluded on next page)

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If so—perhaps it's time for new equipment . . . better equipment that *fits* your job.

It stands to reason that a "*Job-Rated*" truck that FITS your loads and your operating conditions—will give better performance, enable you to give better service to your customers, and operate at lower cost.

Such a truck will have "*Job-Rated*" power—the right one of 7 great Dodge truck engines for power *plus* economy. It will have exactly the right clutch, transmission, rear axle—the right units throughout—for longer-lasting, more dependable service.

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Your Dodge dealer is interested in your continued satisfaction: *First*, by selling you a truck that fits your job; *Second*, by giving you dependable Dodge truck service; *Third*, by providing you with truck parts that are identical with original Dodge "*Job-Rated*" truck parts.

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DODGE

Fit the Job . . . Last Longer !

More Thought to Safety Reports Veteran Supt.

(Continued from preceding page)

from the job. If Malarkey appeared at one end of the job the men, endeavoring to cover up for the foreman, would say he had just gone down to the far end. When he tried the opposite end the same thing would happen. So Malarkey boarded the streetcar, and confused them by appearing suddenly in the middle of the job. The truth then came out.

"He had been visiting a tart along the block," Malarkey related. "I didn't want to lose a good foreman so I went up to the house and threw a scare into her. Told her if she opened the door to my foreman again, I'd run her out of town. And that was the end of my foreman's delinquency."

The Dapper Type

Malarkey's drive, and his casual attitude towards the number of hours he works when he wants to complete a particular operation, bring some grumbles from the engineers inspecting the contractor's jobs. "They ought to call him 'Midnight Malarkey' instead of 'Hard Hat'," complained one engineer on a recent job when Malarkey worked late into the night to complete a concrete pour.

On another occasion one of the engineers, trying to rib Malarkey, got hold of a derby hat and rubbed some carbon from burned matches onto his upper lip in imitation of the Malarkey mustache. Just then Malarkey happened along. Realizing that imitation is the sincerest form of flattery, he beamed all over. Pulling a black eyebrow pencil from his pocket he proceeded to paint a beautiful Groucho Marx mustache on the flabbergasted engineer. "There you are, son," he smiled, "almost as good as the original." The Malarkey sense of humor never fails.

Malarkey does not look 62. He carries his nearly 6 feet of height trim and erect, and his 180 pounds are about what he weighed as a young ironworker. While his hair is grey it is thick and bushy, and blue eyes twinkle behind the bifocals. The Malarkey mustache is somewhat startling when first seen—a jet-black affair which curls at the ends after the whim of the artist manipulating the pencil. As someone explained, "Hard Hat lets a little hair grow on his lip for a couple of days, then does the rest of the job with a pencil. And it ain't bad either. Wish I had the nerve to do it. You can never tell what a guy with a name like that will do next."

On Big Jobs

Malarkey has been doing big things for his company for many years now in the heavy-construction field in western Pennsylvania, as well as in neighboring Ohio and West Virginia. These projects include such large jobs around Pittsburgh as the construction of Allegheny Boulevard, the produce yards and market, the great protecting walls along the Allegheny and Monongahela Rivers at the point of the Golden Triangle. The Pennsylvania Railroad has entrusted much of its construction over the past 25 years to the John F. Casey Co. The flood-control dams, spillway, and canal now under construction at Elkins, W. Va., for the Federal government will cost over $1,250,000. Another flood-control job for a larger amount will soon get under way at Massillon, Ohio.

In addition to its construction activities, the John F. Casey Co. has spread horizontally into other industries. It is allied with the Allegheny Equipment Corp.; the Swindell-Dressler Corp., maker of electric furnaces; and the Railway Maintenance Corp. which manufactures a device for cleaning track ballast. All of these firms are in Pittsburgh. Outside of Pittsburgh the company is interested in the New Castle Refractories at New Castle, Pa., a ceramic industry; and the Elastic Stop Nut Corp. of America in Union, N. J. As Malarkey explained, "Casey will finance anything that looks good". Just to keep the record straight, he financed some of the young Malarkeys, sight unseen, and they all turned out good-looking.

Mountain Life

"I've never felt better in my life than down here in the mountains of West Virginia," said Malarkey looking over the far-flung Elkins flood-control project. "For one thing, the Pittsburgh smog is missing. Labor is a big problem, though. There aren't enough union-card men in the state, and the union will permit only a few of our own men to come in from Pittsburgh. I have two of my own boys working on the job. One is a crane operator while the other, the youngest who is now 20, drives a truck.

"Much to my surprise the other Sunday, while I was sitting in church, I heard the priest announce John Malarkey's marriage banns. I turned to my wife and whispered, 'Is that our son, Jack?'

"'Yes,' she whispered back sharply. 'If you didn't live on that job so much and if you spent a little time at home you'd know what's happening in your family.'"

Malarkey was rebuffed for only a moment. Then the blue eyes twinkled. Running a smoothing hand over the Sunday derby he spoke beneath the black mustache. "Mother," he said, "if it weren't for you I'd be up in that pulpit right now telling you and the rest of these folks what to do."

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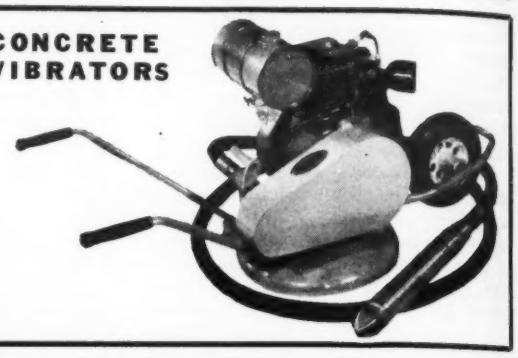
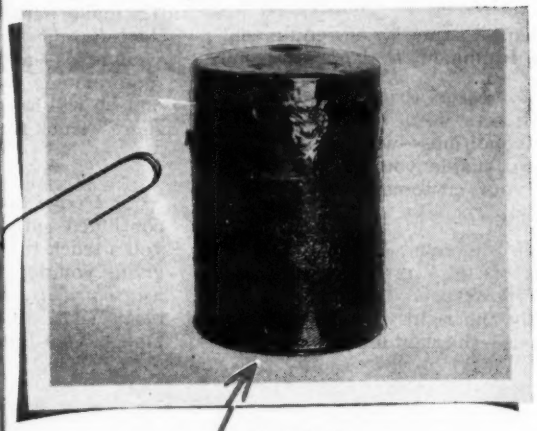


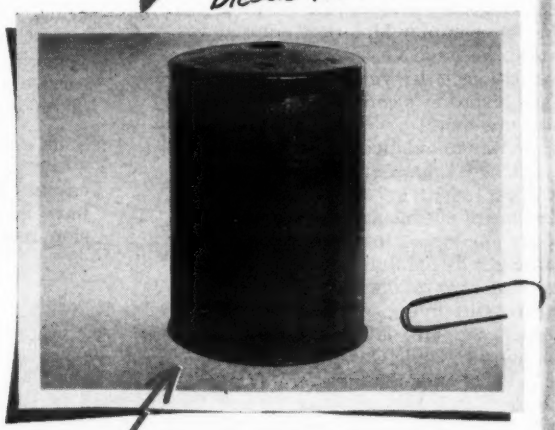
LUBE MEMO

How Joe stopped Filter Clogging



Joe says filters have gummed up like this after about 600 hours on oil he's been using

Joe says nothing but RPM Delo Oil in his Diesels from now on



Here's how the filter looked after 600 hours on RPM Delo Diesel Engine Lubricating Oil

Joe finds RPM Delo Oil keeps filters clean because:

1. It's compounded to resist oxidation and minimize sludge.
2. Its "detergent" cuts down sludge.
3. It remains stable in the presence of moisture.

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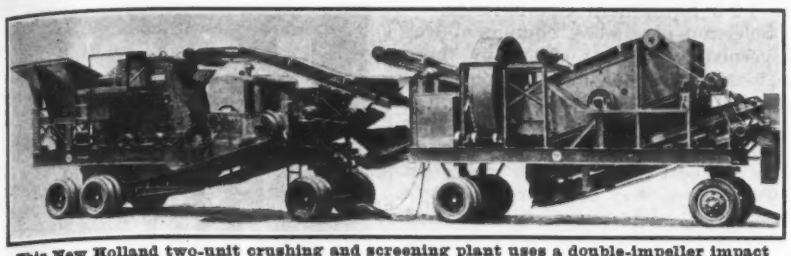


This New Holland two-unit crushing and screening plant uses a double-impeller impact breaker. A large chamber above two 2-ton cast-steel impellers allows breaking in suspension. Capacity of the plant is said to be 200 tons per hour of crushed stone.

Two-Unit Crushing And Screening Plant

A portable two-unit rock-crushing and screening plant has been developed by the New Holland Mfg. Co., Mountville, Pa. It is built around the New Holland Model 3030 double-impeller impact breaker. Capacity of the plant is listed at 200 tons of crushed stone per hour.

A diesel engine provides power for the breaker and also for an electric generator which powers the feeder, conveyors, screen, and the elevating wheel on the screening unit. Portable conveyors can be used with the unit for bin loading or stockpiling.

According to the manufacturer, there is no need for a secondary crushing unit; so the plant is equipped with a light-weight screening plant. Oversize is returned to the breaker from the top deck of the screen by a conveyor and an elevating-wheel arrangement.

The entire plant is mounted on pneumatic tires. The crushing or breaking unit is a full or semi-trailer assembly 28 feet long. It is equipped with rear-axle equalizers, removable front-axle assembly, and Warner electric brakes.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 41.

Improved Electrode

An improved Airco No. 312 electrode has been announced by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, N.Y. It is said to have two advantages over the previous model: (1) it can be used on ac as well as dc reverse-polarity current; and (2) preheating of the electrode is not required, as porosity-free weld deposits can be obtained with either the stringer bead or the full-weave technique.

According to the manufacturer, the No. 312 is an all-position, mild-steel electrode designed to produce weld metal possessing good mechanical properties with low hydrogen content. It can be used for welding high-sulphur free-machining steels; welding hardenable steels where no preheat is used; welding cold-rolled steels which normally exhibit excessive porosity when welded with conventional electrodes; weldments to be vitreous-enameled after welding; and for the production of satisfactorily enameled surfaces without any heat treatment prior to enameling.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 49.

Gear and Sprocket Data

A pocket-size catalog covering its line of stock gears and sprockets can be obtained from the American Gear & Mfg. Co., 5900 Ogden Ave., Chicago 50, Ill. Catalog No. 340 contains 128 pages of information of value to users of this type of equipment.

Units covered in the catalog include gears of all types, bevel, spiral, spur, worm, etc.; special gears; ladder and roller chains; pawls, racks, ratchets, etc. Under each heading is a table showing the sizes in which it is made, number of teeth, pitch, or other relevant data, part number, and price.

The last six pages of the catalog are devoted to engineering data-methods of determining circular or diametrical pitch, how to determine gear-tooth strength, table of working stress for worm gears, and data on standard keyways and set screws.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 59.

Hoists in Many Capacities

A line of hoists ranging in capacity from 8 to 150 hp are described in Bulletin No. H-47 issued by the O. K. Clutch & Machinery Co., Columbia, Pa. This 16-page catalog covers the features of the O. K. design, shows the various models available, and contains photographs of several of the hoists in use.

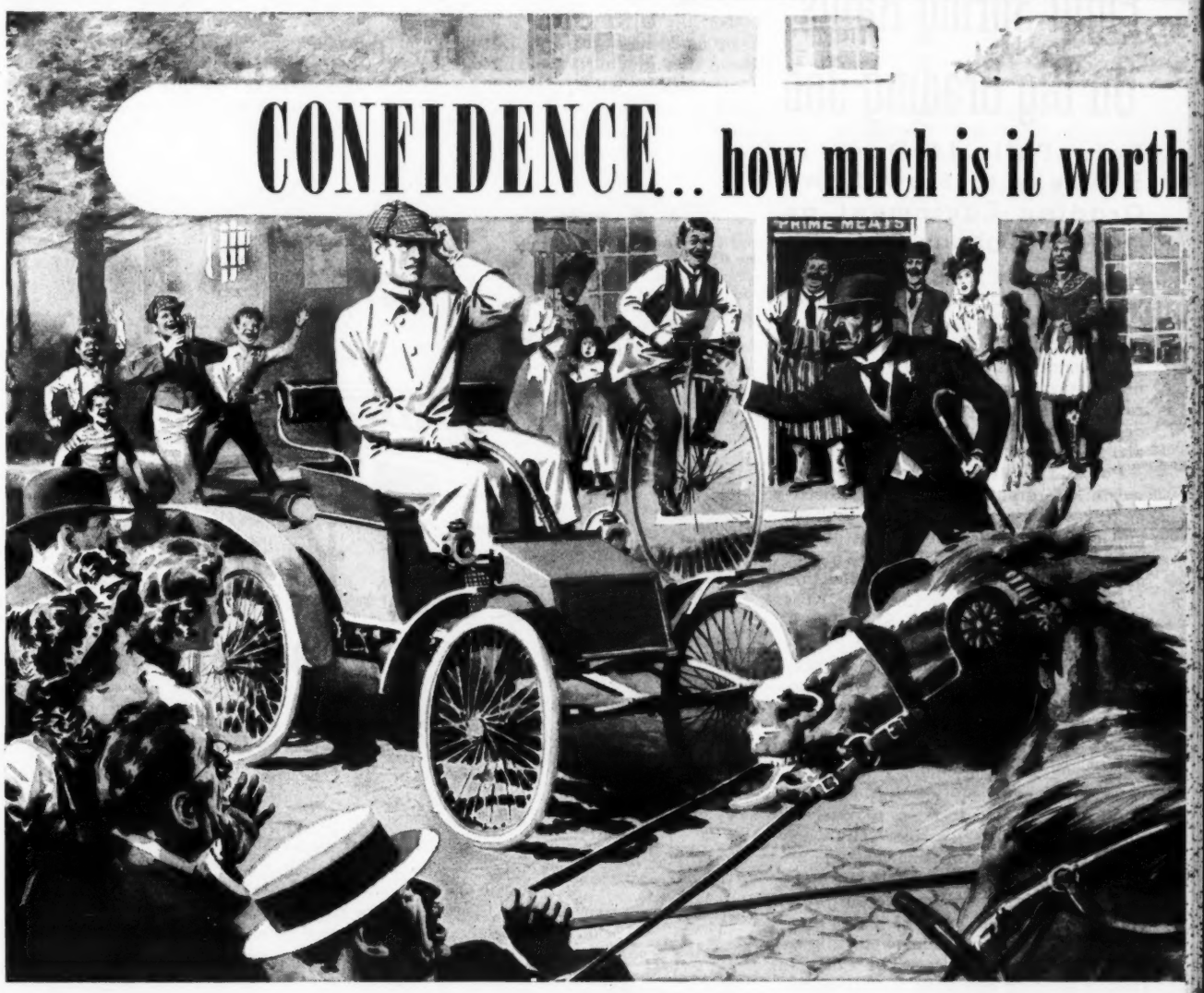
Some of the units described include light-duty single and double-drum hoists, single and double-drum heavy-duty hoists, heavy-duty dragline scraper hoists, and single and double-drum electric hoists. In addition, the company also manufactures a portable elevator of the scaffold type; this is discussed in detail in the catalog.

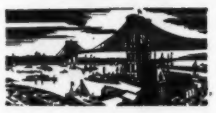
The bulletin also contains a page of useful data for engineers: a formula for finding horsepower, rope pull, and rope speed; a formula for determining rope capacity of the drum with all wire-rope sizes; a table for transposing grade into degree of incline; and a table for determining the tension on wire rope for various degrees of incline.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 57.

Davey Dealer, New Mexico

The appointment of M. & F. Equipment Co., Albuquerque, as distributor in New Mexico has been announced by the Davey Compressor Co., Kent, Ohio. The new distributor will offer complete sales and service on all Davey items.





IT WAS NINE YEARS before the first gasoline-driven automobile in the United States was operated by C. E. Duryea that the Brooklyn Bridge was opened in 1883. This fabulous engineering achievement was the culmination of over 26 years of planning and building, of bold vision and heart-breaking struggle, by John A. Roebling and his son Washington.

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ROEBLING

A CENTURY OF CONFIDENCE

C. & E. M. Photo
Key machine in Porter-DeWitt's second digging group is a new Euclid loader, towed by a D8 tractor. Here its 48-inch conveyor belt loads a bottom-dump Euclid.

Fight Spring Rains On Big Grading Job

Rain Falls 14 Days in 5 Weeks to Slow Down Grading Equipment on Vital Highway Project

✦ HARD, driving spring rains which fell 14 days in 5 weeks' time presented to Porter-DeWitt Construction Co. of Poplar Bluff, Mo., one of the toughest work conditions faced this year by any midwest contractor. With each day's rain good for several more days of delay, how to find a dry cubic yard of dirt became something of a puzzle.

Porter-DeWitt has about $600,000 worth of grading, select stabilized-aggregate base course 4 inches thick, and concrete culvert structures on the new 9.6-mile section of U. S. 66, under a subcontract with Koss Construction Co. of Des Moines, Iowa. The Koss contract with the Missouri State Highway Department totals slightly in excess of $1,000,000. It includes Porter-DeWitt's grading and other work, as well as the 24-foot reinforced-concrete paving Koss will place later on.

With only 230 working days from February 1, 1947, in which to finish the work, these contractors well knew how important it was for them to push it through as fast as possible. Highway 66, "the main street of America", is one of the most heavily traveled routes through the state. The section now being replaced was built 21 years ago, and had become obsolete as to alignment and riding surface. The Porter-DeWitt grading operation is cutting an entirely new route for the present winding highway.

This new section of U. S. 66 will ultimately be a dual-lane high-speed concrete highway, with eastbound and westbound lanes separated by a 24-foot parkway. The present contract calls for the construction of the westbound half. It will be used as a two-way highway, probably for years, until the other construction is done. Right-of-way has been acquired for all this work, however.

The Porter-DeWitt grading operation is aimed at shaping from 8 to 12 feet of 2 to 1 backslope, 10 feet of shoulder, and 24 feet of roadway.

Materials Vary Widely

There is an extremely wide variety of native materials in this relatively short section of highway. A black topsoil, heavy in clay-gumbo and organic matter, covers the ground. Beneath that is a formation generally called hardpan in this section of Missouri. It is a cemented, quite impervious layer of heavy clay with boulders and gravel present. In low spots there are layers of plain black mud. Under this overburden come the rock formations, ranging from sedimentary sandstone and limestone to chert and flint—rock so hard it will dull a drill bit in 2 feet of travel.

Terrain is hilly, with some cuts as deep as 20 feet. All in all, it is one of those dirt-moving jobs which call for some study, good organization, and good equipment.

1-2-3 Equipment Combination

Selection of grading equipment was governed to a great extent by these factors—variety of materials present, and hilly terrain. Porter-DeWitt figured originally that three hard-hitting combinations of equipment would start in at the east end of the job and finish everything as they proceeded.

First, a pioneer team would be used to rough in the low spots over the new drain structures, and take some of the dirt off the top of hills. Hauling under 1,000 feet one way, this team would be composed of two new Super C Tournapulls with a D7 Caterpillar snatch tractor to help with their loading. Two LeTourneau FP Carryalls with D8 Caterpillar tractors towing, were to be a part of this team. A D8 with a LeTourneau K-30 Rooter was put in this gang to keep any high outcrops of hardpan rooted loose. A LeTourneau tandem sheepsfoot roller with an Allis-Chalmers HD-7 tractor would compact the bottom of new fills.

(Continued on next page)

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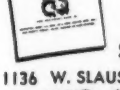

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C. & E. M. Photo
Working in front of a Lima shovel, this Ingersoll-Rand wagon drill bores holes in a rocky cut. It is part of the third equipment group Porter-DeWitt set up for its contract on U. S. 66 in Missouri.

The second group of machines was set up to include fast high-capacity loading and hauling equipment which could dig almost anything but solid rock and haul it at high speed for distances up to 2,000 feet one way. This group included a new Euclid loader, pulled by a D8 Caterpillar tractor, serving a fleet of six new bottom-dump Euclids. The new Euclid loader, though introduced last season, is the first of its kind in action on Missouri highways, and it consistently attracts a flock of automobiles and spectators out of the ever-passing traffic.

A Caterpillar D7 machine with a LeTourneau bulldozer was assigned to this second group to keep the dumped lifts spread, and a D4 with a LeTourneau tandem roller was put on for compaction. A D8 with a LeTourneau K-30 Rooter was also assigned here to help rip loose some of the hardpan and really tough conglomerate material this group had to load.

For the third and final equipment group Porter-DeWitt had to choose a combination capable of drilling, blasting, loading, and hauling solid rock. Three 315-cfm air compressors were brought in: a Schramm, a Chicago Pneumatic, and an Ingersoll-Rand. So were a Cleveland and two Ingersoll-Rand wagon drills. Six Ingersoll-Rand Jackhamers were laid out ready to go to work on secondary shooting, because the contractor knew that clay pockets present within the rock would make the job tough.

A 2-yard Lima shovel with an Amsco dipper, serving three bottom-dump Euclids, was sent in for the loading. A D7-mounted bulldozer was brought in to keep dumped rock leveled off in the fills. At first there was some doubt as to whether broken rock could all be dumped from the bottom-dump wagons, but this was done successfully.

Thus the equipment line-up was planned. Groups 1 and 2 were to move out ahead; Group 3 would finish the rock cuts and complete the job.

As any good theory has some practical limitations, this one ran into rain. Heavy showers poured down by day and night. The topsoil turned to mud, and the water refused to drain away through the hardpan. Fourteen days of rain, each good for a day or more of delay, hit the job in the first five weeks of grading operations.

General Superintendent W. R. Stoune of Porter-DeWitt Construction Co., who is in charge of its work there, commented dryly, "What started out to be a good plan has ended up in a search for a few cubic yards of dry dirt".

The rain was met by shuffling equipment groups as sections became dry enough to dig. When CONTRACTORS AND ENGINEERS MONTHLY'S Western Editor visited the project, the first group was about a mile ahead of where it should have been, but the dirt was dry and Stoune had calculated a mile move was much better than a continued shutdown of machines.

Culvert work and the placing of a few corrugated-metal pipe drains had not been affected too adversely, and these parts of the subcontract stayed out ahead of the first equipment team.

Excavating Methods

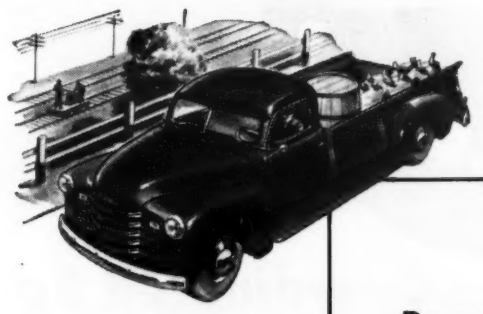
The first group of equipment was held together, despite moves from muddy to drier locations, and worked a 10-hour shift six days per week—weather permitting, of course. One-way hauls have averaged 800 feet, with 1,000 feet a fair maximum and 550 feet about the shortest haul.

The operator-controlled tow-bar hitch which was developed several years ago in the west is being used on the D8 Caterpillar tractor which helps the Tournapulls to load. This hitch is nothing more than a stout steel ring, fastened to the end of a steel tow bar. The D8 operator can raise or lower this device by means of preformed plow-steel control cables on his power-control take-off drum.

In action, the D8 moves in ahead of a Super C with the ring dragging the

(Continued on next page)

C. & E. M. Photo
This Lima shovel loads blasted stone to a bottom-dump Euclid on the U. S. 66 grading job. Excess big rock is shown in the foreground.



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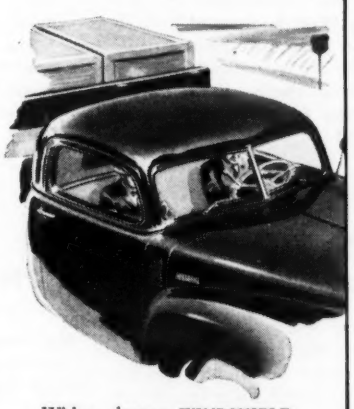

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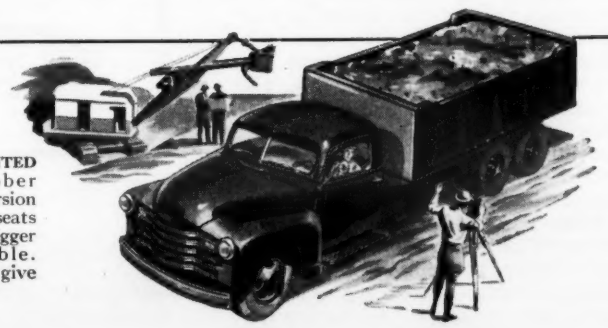

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Fight Spring Rains On Big Grading Job

(Continued from preceding page)

ground. The Super C, moving slightly faster than the tow cat, passes over the ring. The ring is then raised to catch a towing hook underneath the forward frame of the Tournapull prime mover, and the D8 guns its throttle to help the Super C as much as possible.

The Tournapulls are being loaded in low gear, pouring just enough engine power into their transmissions to keep the big lug-grip tires turning steadily without spinning. All loading is being done downhill as much as possible.

The tractor-scraper units are being used on the shortest hauls of any particular set-up, with the Super C's taking care of the hauls to the outer limits of that location. Cut and fill quantities are well balanced.

Specifications require embankment densities equal to about 90 per cent of maximum density as determined by the standard compaction test. The material cannot be rolled in with much more than 17 per cent moisture where the heavy clays occur, without disturbing that objective. That is why so many moves have been necessary; otherwise the machines would dig material too wet to use for fill. There have been many times when any excavation at all has been impossible.

The excavated dirt is dumped in thin lifts, 8 to 12 inches deep, loose measurement, and spread by an Allis-Chalmers HD-7 and a Caterpillar D7-mounted bulldozer. The A-C machine uses a Gar Wood hydraulic, the D8 a Caterpillar blade. Rolling by a sheepsfoot machine is carried on constantly, to develop the specified density.

The only exception to rolling occurs where good topsoil is stockpiled for use in shoulder work after the road has been paved. This material, free from large stones, is being stored close by in an uncompacted dump.

All cuts made by this first equipment group follow the same general pattern. Topsoil is stripped and stored. Hard clay is found, and digging becomes tougher. The first outcropping of hardpan appears, and the K-30 Rooter goes into action. The formation is so abrasive that the single ripper tooth has worn out in four hours' use many a time. In fact, that life is a fair job average so far. Experiments have been under way with Murex and Hardex hardfacing rod to try to prolong the life of Rooter and shovel teeth.

Output starts in high, and drops off as the cuts get down to harder digging. There has been no hard and fast rule about when to pull off this first equipment but the move is made at the point where to continue might tear up the machines.

Elevating Grader Used

The key machine in the second digging group is a new Euclid loader, towed by a D8 Caterpillar tractor. With its 48-inch conveyor belt carrying excavated material up to a fleet of Euclids, this machine loaded 153 of these hauling units in 4 hours and 50 minutes. Each wagon carried a loose load of over 12 cubic yards.

Very often this machine moves in to a new cut, though it has been used to dig material left behind the first group. It works best where there is a heavy layer of dirt or alluvial material to dig. Starting at the 2 to 1 side-slope stakes, it works the cut down in approximately a level lift.

Boulders embedded in the clay and dirt have presented something of a problem. When these are not too large, the new loader is picking them up successfully, after a Rooter has passed through, and repairs or maintenance have not been excessive. However, the abrasive nature of the boulders appears to have shortened the life of the conveyor belt. Euclid field engineers on the job estimated that the rig would dig about 160,000 cubic yards on the present belt, but one of the earlier models working in much softer earth dug close to 1,000,000 cubic yards without belt replacement.

C. & E. M. Photo

A Gar Wood bulldozer mounted on an Allis-Chalmers HD-7 tractor spreads a lift which was dumped by the Super C Tournapull in the background.

The loads of material which a fleet of six bottom-dump Euclids are hauling from this machine are dumped in fills, spread by a D7-mounted bulldozer, and rolled by a heavy sheepsfoot roller delivering about 430 pounds of compression per square inch of tamping-foot surface.

Drilling and Blasting

Hard rock cuts are moved by the third equipment group, with drilling such an important item that it is carried on 24 hours a day to keep blasting out ahead of the shovel. Ingersoll-Rand Jackbits are used on I-R steel on all three wagon drills, and are resharpened by the Southwest Grinding Co. of Springfield, Mo.

Wagon-drill holes are drilled a maximum of 14½ feet deep, using 16-foot-maximum steel. While the same drills on other jobs in solid limestone have put down 450 linear feet of hole per 9-hour shift, the irregular formation on this contract has reduced that figure to as low as 160 linear feet of hole a shift per drill. The rock varies from sandstone to limestone to flint. When hard flint boulders are found, drill bits wear out in about 2 feet of travel, but they give about 20 feet on a sharpening in the other formations.

Clay pockets down deep under the rock are also a headache. It is hard to

(Concluded on next page)

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Now Barber-Greene presents more new and important time-and-cost-saving advantages in this latest B-G Central Mixing Plant equipment.

Barber-Greene engineers have developed a new, simplified drive system. Power is transmitted from a central power unit—through shafts—to the Dryer, Cold Elevator, Reciprocating Feeder, Hot Elevator and Gradation Control Unit.

4-bin Gradation Unit with 3½-deck vibrating screen provides new ease and flexibility of multiple aggregate control. Aggregate calibration and bin sampling have been simplified. Convenient hoisting device makes it easy to erect Hot Elevators and screen.

The need for pits for Hot and Cold Elevators has been eliminated.

All these—and others—are features you want, and what you'd expect of Barber-Greene, the pace setter in better bituminous mixing.

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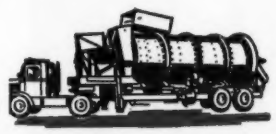
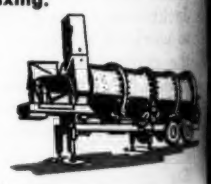


..New CONVENIENCE!



Semi-Trailer Mounting on Model 837 Dryer and Model 866 Gradation Control Unit; Model 880 Hot Elevators have removable pneumatic-tired dolly for towing; all units designed for maximum portability, flexibility, ease and speed of erection.

No Foundations. Adjustable jack-legs eliminate time-wasting cribbing. The 837 Dryer shown above is a single-drum, high-capacity unit with high roto-elevator discharge.

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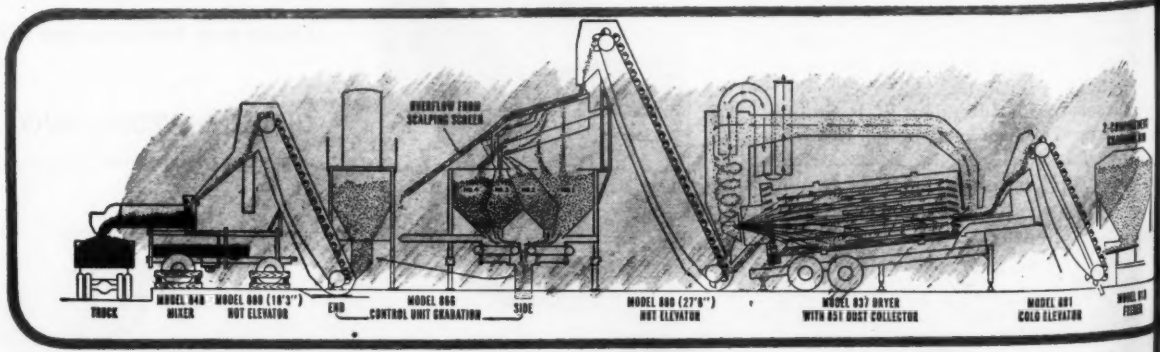


CONSTANT FLOW EQUIPMENT

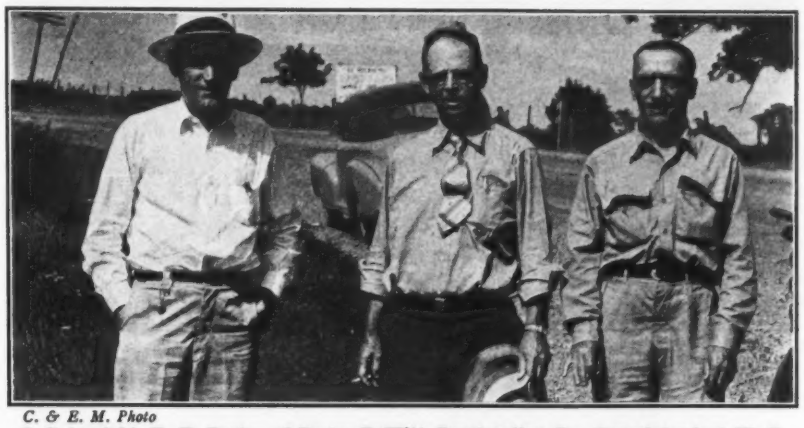
Barber

drill them without sticking the bits, and it is impracticable to spring these holes. The drill holes are started down at a 2½-inch diameter, and are sunk on 6-foot-square centers.

Atlas Gelodyn No. 1 stick powder is loaded into the holes, without springing, and each hole equipped with a No. 6 Atlas electric blasting cap. Traffic is generally stopped at least 1,000 feet on both sides of the blast when it is set off by a hand blasting machine.

A great deal of secondary drilling has been necessary, because of the rock seams and pockets. Large-sized stones are passed by or cast aside by the Lima 2-yard shovel, and they are re-drilled with Jackhamers and reloaded with powder. A great number of these shots are pulled, generally in late afternoon after the shovel knocks off from loading.

Blasted stone is handled nicely by the Lima, using an Amsco dipper. The rock is so abrasive that new dipper teeth are installed after each shift. Broken stone is handling quite well through the bottom-dump doors of the three Euclids assigned to the shovel, and a D7-mounted bulldozer is used to make fills out of this material. In general, broken stone is placed in the very bottom of the deeper fills.



C. & E. M. Photo

Left to right, E. K. Porter of Porter-DeWitt Construction Co., Superintendent W. R. Stoune, and Resident Engineer J. J. Krebs pose for the C. & E. M. camera.

Heavy rains succeeded in stopping the shovel work about as much as they did the other groups of equipment, and moves of this third group have at times been slow and expensive.

Personnel

For Porter-DeWitt Construction Co., W. R. Stoune is running the project as General Superintendent, with Vernon Templeton as his assistant. The Missouri State Highway Department is represented out where dirt and mud are flying by Resident Engineer J. J. Krebs

Carl W. Brown, Chief Engineer of the Missouri State Highway Department, is in general charge of this big new project, with Engineer of Construction J. J. Corbett directing the administration of the contract.

Committee Discusses Western Construction

Reports by western states on their highway construction indicate that the Public Roads Administration's policy of holding contract-award prices in line with 1946 prices has not seriously slowed down construction.

This was brought out at a meeting of the Joint Cooperative Committee of the American Association of State Highway Officials and The Associated General Contractors of America, Inc. The meeting was held in conjunction with the annual meeting of the Western Association of State Highway Officials in Missoula, Mont., last August.

The meeting also brought out that the price situation in general is spotty—higher in some states than in others and in different sections of the same state. Contractors are experiencing rising costs in equipment, parts, and labor. They report labor shortages, especially for rural projects. And equipment deliveries, too, show considerable variation: very tight in some states, easing in others.

The southwestern states reported an increase in competitive bids. It was pointed out that some states still retain the escalator clause covering freight, but that as competitive bids are increasing, its necessity is not as apparent as in 1946. All agreed that insistence by both contractors and awarding authorities on firm prices and bona fide delivery dates would help stabilize prices.

A way to reduce the price of small concrete bridges was advocated by some of the members present at the meeting. They suggested that manufacturers could build uniform units for trucking to a job to be used in construction.

Other subjects discussed at the meeting included methods of preparing engineers' and contractors' cost estimates, productivity of labor, working conditions in labor agreements affecting costs, use of local materials in specifications, supply of contractors, and how to encourage bids from contractors.

Kit of Hose Clamps

A kit of parts for clamping hose has been made available by the Punch-Lok Co., 321 No. Justine St., Chicago 7, Ill. The kit contains 87 clamps of the three most widely used sizes, and a P-38 Clamp-Master Loking tool for applying them.

The clamp assortment consists of 50 of the No. 0-325 3⅛-inch open-end clamps, 25 of the No. 311 1⅜-inch preformed clamps, and 12 of the No. 3 13/16-inch preformed clamps. Refill assortments of 112 clamps, without the Loking tool, are also obtainable.

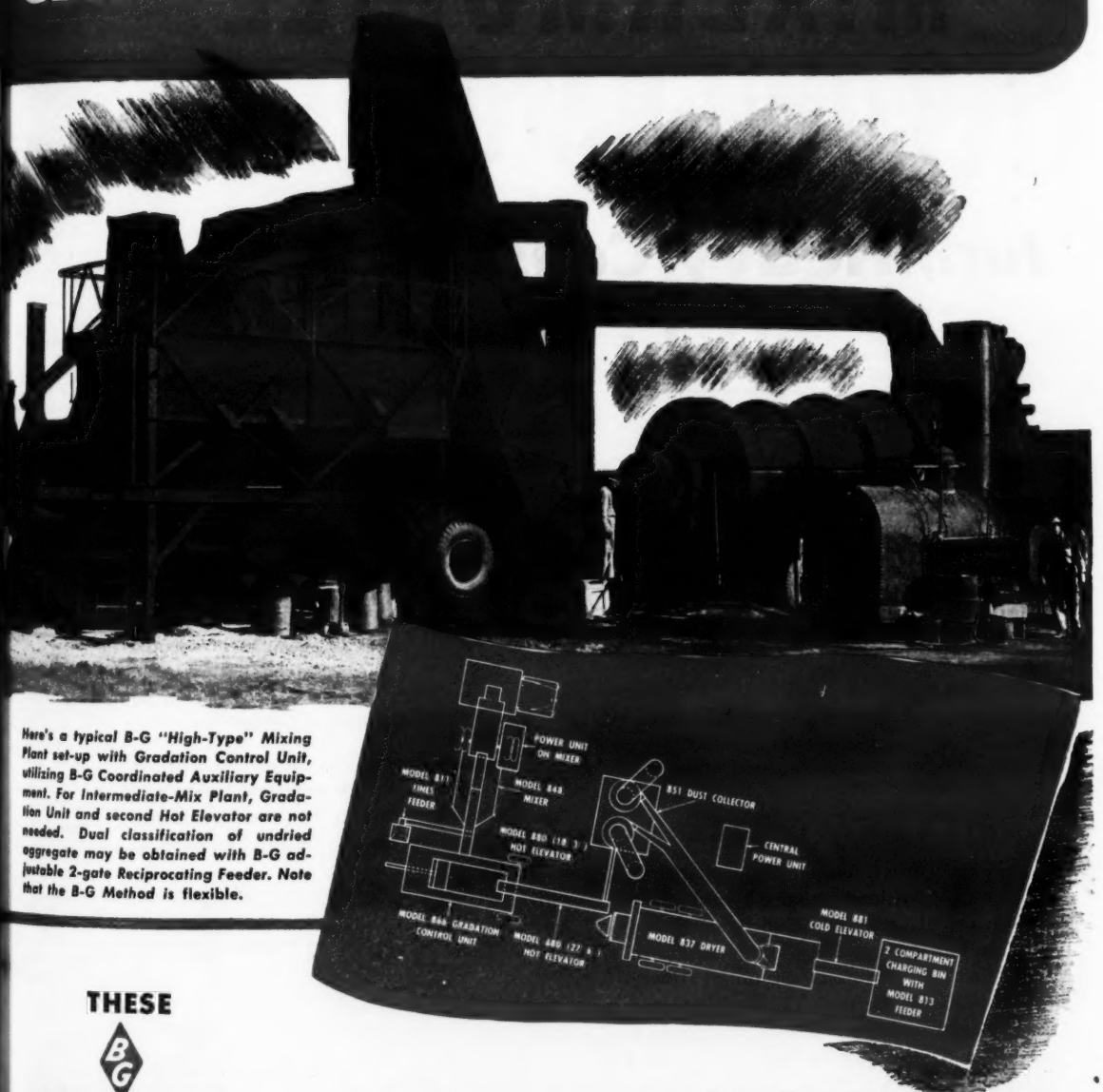
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 34.

Gar Wood Staff Changes

E. D. Wallace has been named Sales Manager of its Buckeye Traction Ditcher Division by Gar Wood Industries, Inc., Wayne, Mich. W. C. Petersen has been appointed Service Manager for the Division at Findlay, Ohio.

W. E. Dawson and W. R. Steenrod have been appointed District Managers —General Line for Gar Wood Industries. Mr. Dawson will cover the west-coast territory and Mr. Steenrod will center his activities in Milwaukee.

CAPACITY PLANT!


POWER UNIT ON MIXER
MODEL 811 FINES FEEDER
MODEL 848 MIXER
851 DUST COLLECTOR
CENTRAL POWER UNIT
MODEL 880 (18 ft.) HOT ELEVATOR
MODEL 881 COLD ELEVATOR
MODEL 846 GRADATION CONTROL UNIT
MODEL 880 (27 ft.) HOT ELEVATOR
MODEL 837 DRYER
2 COMPARTMENT CHARGING BIN WITH MODEL 813 FEEDER

Here's a typical B-G "High-Type" Mixing Plant set-up with Gradation Control Unit, utilizing B-G Coordinated Auxiliary Equipment. For Intermediate-Mix Plant, Gradation Unit and second Hot Elevator are not needed. Dual classification of undried aggregate may be obtained with B-G adjustable 2-gate Reciprocating Feeder. Note that the B-G Method is flexible.

THESE BG ADVANTAGES will interest You

- High Discharge Dryer which eliminates Hot Elevator pit. Positive charging feeder on Dryer prevents bridging of stable mixtures.
- Shaft and gear box drives, with sealed antifriction bearings and fewer power units.
- Four-bin aggregate separation — your choice of 2, 3 or 4-aggregate gradation.
- Instantaneous bin sampling and simplified calibrating facilities.
- Speedier, easier erection and dismantling; semi-trailer mountings for greater portability.
- Dual Cyclone Dust Collector reclaims fines from Dryer exhaust gases and reduces dust nuisance.
- New Fines Feeder makes it convenient to add a measured proportion of fines.
- Extensive application of antifriction bearings.
- Lower Maintenance Costs.
- Barber-Greene Experience: broadest background in practical application of this most advanced bituminous mixing method. It is at your service—through your B-G distributor.

See the distributor near you, or write to Barber-Greene, Aurora, Ill. for descriptive literature.

Barber-Greene AURORA, ILLINOIS

A Modern Crusher Licks a Tough Pit

(*Continued from page 1*)

soaked by spring rains and snow. Many of the round boulders are oversize even for a big 10 x 36-inch primary crusher.

The pit, however, is also one of the best natural deposits in the area for the production of aggregates for highway purposes. And when the Ogden, Utah, District Office of the Public Roads Administration advertised for bids on 4.292 miles of reconstruction on U.S. 40 in Uinta National Forest, it specified the pit as a possible source of crushed rock for the 4-inch compacted sub-base and the asphaltic-concrete surfacing.

The reconstruction of this section of U.S. 40 is part of a general improvement program on the transcontinental route through this national forest. It replaces a narrow, winding road which led down through a narrow canyon from the Strawberry Reservoir—a road on which numerous traffic accidents have occurred in the past. Classed as a forest highway in public lands, the job was designed and administered by the Public Roads Administration.

Set in the middle of a 200-foot right-of-way, the new road has a 38-foot roadbed with a special 4-inch-thick compacted sub-base full width, and an asphaltic-concrete wearing surface 24 feet wide. It is well graded and drained. In fact, a small mountain stream is carried through one of the new 70-foot fills by means of an 8-gage Armco Multi Plate culvert 60 inches in diameter and 212 feet long.

Started July 11, 1946, the entire project was scheduled for completion by about August 11 this year; that included placing the hot-mix surfacing.

Rock Production Biggest Job

The toughest part of the entire project was the production of crushed rock. The equipment selected was a new Cedarapids unitized portable crushing plant, consisting of a Model BB primary jaw crusher 10 x 36 inches, with a 48 x 72-inch double-deck screen. Directly in line with the primary unit a Cedarapids Model CCC secondary crusher was set up. This unit has a 40 x 24-inch roll crusher, with a 4 x 12-foot double-deck vibrating screen.

Both primary and secondary crushers were thus equipped to reject fines and pass the sound rock on, as it was crushed, to the storage bins. The roll crusher was also equipped with a 6-shoe segment shell on each roll, which made possible the rapid interchange of grinding shoes without extensive teardown of the plant. In this new plant, the roll crusher is accessible to mechanics.

C. & E. M. Photo

A truck loads under the bin at the Cedarapids portable crushing plant Mendenhall set up to produce crushed rock for sub-base and asphaltic-concrete surfacing on U. S. 40. In the background is a big stockpile of hot-mix rock.

Specifications were also quite rigid regarding the screen sizes acceptable for crushed material. On about 21,400 tons of base-course rock, sieve requirements were as follows:

Sieve Size	Per Cent Passing
1-inch	100
¾-inch	70-100
⅜-inch	50-80
No. 4	35-65
No. 10	25-50
No. 40	15-30
No. 200	5-15

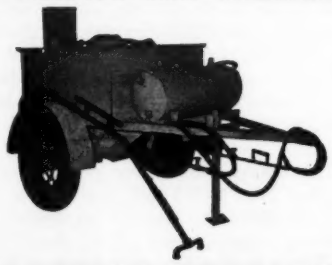
Approximately 6,600 tons of crushed aggregate for the surface mix had to be made to these specifications:

Sieve Size	Per Cent Passing
¾-inch	100
No. 4	45-65
No. 10	30-50
No. 200	3-8

A variable quantity of crushed rock also had to be made for backfill around perforated-metal drain pipes, installed where necessary on the job. Since this material was made on an extra-work order, the final amount to be manufactured had not been accurately determined when the job was visited for CONTRACTORS AND ENGINEERS MONTHLY.

The new Cedarapids unit was delivered by the Kimball Equipment Co. of Salt Lake City, and set up in the pit. With full knowledge of the tough nature of this deposit, V. C. Mendenhall acknowledges that he had some preliminary doubts as to whether the new machine should be exposed to material that hard.

(Continued on next page)



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White Mfg. Co.
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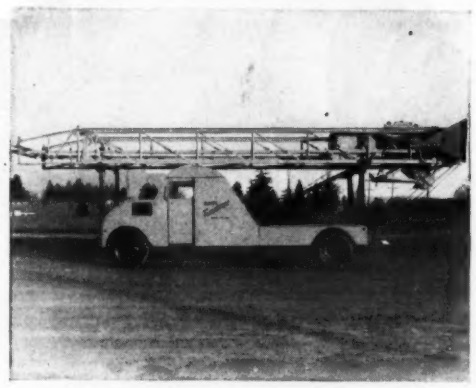
TOWERMOBILE

turn Heavy Construction into Light work!



MIXERMOBILE

A truck-mounted mobile concrete plant containing a self-loading skip, 2-yard mixer and an elevating tower. Can be driven to the job, and set up ready for operation in less than 30 minutes. Standard tower height is 35 feet with one 10-foot extension. Tower height can be increased further to a recommended limit of 55 feet.

ONE MAN can *mix* and *hoist* 50 yards of concrete per hour. One man, handling all controls from a catwalk, can furnish concrete at hopper spout continuously.

Write Dep't CE for complete information and name of nearest dealer.

TOWERMOBILE

Without modern, labor saving equipment, *heavy construction* too often is just what the name implies, hard, heavy, costly work. Towermobile and Mixermobile have been designed to speed up construction and reduce labor costs. Towermobile is a portable hoist for concrete that can be erected up to 55 feet. Elevating bucket is interchangeable with a 6 ft. x 6 ft. platform for hoisting other building material.

ONE MAN drives it to the job, sets up for operation in 15 to 30 minutes, hoists and pours concrete up to 50 yards per hour. Tower is raised or lowered mechanically.

MIXERMOBILE MANUFACTURERS

6855 N. E. Halsey Street - Portland 16, Oregon

C. & E. M. Photo
A new Caterpillar D8 tractor with a Caterpillar bulldozer feeds the tough varied-size pit-run material to a hopper over a belt leading to the screens of Mendenhall's Cedarapids plant.

After a preliminary run, in which the machine produced crushed rock at the rate of 180 tons an hour (it is rated at 200), Mendenhall made plans to go ahead and crush his rock for the job as near as capacity as possible, stockpiling it for later use. He then made a successful bid on a state highway contract near Lehi, and when his job was visited, he was making plans to move the new plant down to the other job well ahead of the time necessary to complete the present one.

"We have operated here with a great deal of care," he said, pointing to the big boulders left behind. "But the machine has proved it can stand up to punishment. We will probably push it a little harder at Lehi."

Crushing Methods Described

In order to feed the pit-run material into the primary unit, a timber hopper was built, with gravity feed to the conveyor belt which led up to the first set of screens. This hopper was fed all through the job by a new Caterpillar D8 diesel tractor with Caterpillar bulldozer blade and power-control unit.

On a short-push distance of about 175 feet, this machine kept the plant supplied even when it turned out 180 tons an hour. The Caterpillar didn't loaf when the plant was in high gear. "It kept us so busy around here there ought to have been a dozen of us," laughed the catskinner and the plant operator.

Raw pit-run material dropped down from the initial trap, passed along up a 24-inch belt conveyor, to drop down on a vibrating screen with 3-inch square openings.

All large stones retained on this screen then bounced along to drop down in the 10 x 36-inch primary jaw crusher, where they were reduced to small pieces and sent on towards the secondary unit. All dirt and fine material from the pit passed on through the bottom screen to a dump conveyor, and was rejected in a neat pile at the side of the primary unit. As this pile of rejectable material built up, the bulldozer came down out of the pit to push it off to the side.

Also, in order to keep them out of the jaw crusher, a laborer was stationed ahead of the unit to cast many of the big plus-12-inch rock boulders aside. While the jaw crusher would handle these stones without apparent damage, they sometimes caused smaller rock to bridge over, shutting off the feed to the jaw crusher. It was good business to keep as many of them out as possible.

Material retained on the bottom deck of the primary screening unit then joined the crushings from the primary jaw and were sent, via conveyor belt, to the secondary unit. All power for the primary crusher was supplied by a Caterpillar D8800 diesel engine through a V-belt drive and friction clutches.

The secondary unit, containing screens and the big 40 x 24-inch roll crusher, was powered by a General Motors diesel engine. It also rejected some of the fines. Material fed to this unit from the primary passed through a double deck of screens and then on out a conveyor to a 25-cubic-yard storage bin with sliding bottom-dump gates for rapid loading of trucks.

The secondary unit was also equipped to pick up any oversize stones from the screen deck on top and by-pass them through the roll crusher until it had reduced them to size. Roll-crusher shoes were set for a clearance of 1¼ inches to produce the 1-inch-maximum-size stone. While a certain amount of oversize was by-passed back through the crusher under this arrangement, crusher wear was not excessive despite the abrasive quality of the same rock which caused two other contractors, less than ten years ago, to leave the site.

Crushed rock was then pulled from the temporary storage bin by means of a bottom-dump sliding gate, passed to a fleet of 5-yard dump trucks, and either hauled to the job or stockpiled about 300 feet to one side of the plant for later use. One such pile was made, containing all the material needed for hot-mix surfacing. When the new crusher performed at near-capacity figures and showed no signs of breaking down, Mendenhall decided to crush the balance of his sub-base stone and bid another job.

Rock Makes Excellent Sub-Base

Because all the rock particles are angular, they interlock in the finished sub-base and develop a great deal more shear strength than rounded particles do. Moreover, natural fines smaller than 200 mesh invariably swell when they become wet, causing certain undesirable bulking. This improved method of processing, which meets PRA specifications designed to prevent just such conditions, will undoubtedly make a better road.

The crushed rock was hauled to the

(*Concluded on next page, Col. 3*)

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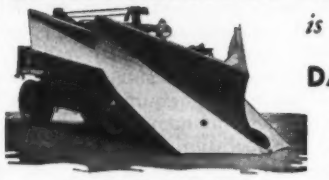

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GMC 2-cycle Diesel truck engines provide twice as many power strokes as conventional 4-cycle engines. Pay loads can be greater because engine weight is less, with the same amount of power. Other famous GMC Diesel engine features include Direct Triple-Duty Injectors, Full-Flo Lubrication, Pressurized Water Circulation, Thermostatically Controlled Water By-Pass and Radiator Shutters.

GMC Diesel truck chassis are exclusively engineered for Diesel operation with such outstanding features as Straight Frame Side Rails, Wide Track Front Axles, Heavy Duty Clutches and Brakes, Transmission and Rear Axle options to handle all types of jobs.

GMC also gives you the widest selection of Diesels on the market today . . . 8 different truck and tractor models with Gross Weight Ratings from 30,000 to 90,000 pounds . . . all ready for quick delivery.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

The Tarco Scotchman spreader for rock salt or calcium chloride throws material to the left, to the right, or centered with the dump truck.

Ice-Control Spreader

A spreader for use with a dump truck and specifically designed for spreading rock salt or calcium chloride for ice control has been put on the market by the Tarrant Mfg. Co., Saratoga Springs, N. Y. It can be fed by the bag, or, if bulk materials are used, it may be fed directly through a door in the truck's tail-gate. It is said to spread effectively at speeds up to 20 mph.

The Tarco Scotchman spreader, constructed mainly of stainless steel, has a directional-spread feature; it is said to throw in a bird-shot pattern, to the left, to the right, or centered with the truck. According to the manufacturer, none of the material is thrown up under the truck. Rate of application, direction of spread, and width of spread are controlled by levers at the operator's hand level. Width of spread can be regulated from 3 to 20 feet.

The Model SS spreader has a hopper capacity of 200 pounds of salt or 150 pounds of calcium chloride. It is 27 inches wide, 42 inches in depth, and 52 inches in height. Total weight, including hanger frame, is 240 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

Slow-Speed Diesel

A single-cylinder stationary diesel engine is now in production at the plant of the Lorimer Diesel Engine Co., 16th & Wood Sts., Oakland 7, Calif. A vertical 4-cycle full diesel, it develops 10 hp at 600 rpm, 12 hp at 720 rpm, and 14 hp at 800 rpm.

Principal feature claimed for the Sturdy Scot is its slow-speed operation. It has a bore of 5¾ inches, a stroke of 7½ inches, and a 3¾-inch-diameter crankshaft carried on two main Timken roller bearings. The piston is 9⅛ inches long, and carries five rings. Fuel system consists of standard heavy-duty pumps and injector. Lubrication for main, crankpin, and wristpin bearings is force-feed.

Standard equipment includes governor, lubricant pump, fuel and lubricant filters, tools, and instruction manual. Optional equipment includes power take-off clutch, heavy-duty radiator, water pump, fuel-transfer pump, electric or air starting equipment, or impulse magneto for manual gas starting. Models for operation on natural gas are available on order. Generator sets of 10-kva are also available.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 18.

A Modern Crusher Licks a Tough Pit

(Continued from preceding page)

far end of the job first, and spread according to station. Each load was weighed on scales at the plant, and the content of the sub-base was constantly balanced against these actual scale weights. A PRA inspector on the scales and a PRA representative on the highway site assured this result for the Government.

Rock was dumped from the trucks, spread out accurately by a Caterpillar No. 12 motor grader to survey blue-tops established by the PRA. The crushed material was bound together by applications of water from a sprinkler truck before it was compacted. A Buffalo-Springfield tandem 10-ton steel-wheel roller was used to mash the crushed rock down to its final compaction.

The result was a tight, well drained blanket of stone between the earth subgrade and the asphaltic-concrete riding surface which will carry the traffic. This type of insulating sub-base is the latest trend in good modern highway construction.

The new route will provide a safer, faster, more pleasant journey than did the old twisting road which had become obsolete for modern passenger automobiles. The new route is expected also to reduce the amount of vehicular tie-up in winter, when heavy snows fall on this section of highway.

Personnel

The job, bid in at a contract price of $170,000, was designed and administered under the supervision of F. W. Smith, District Engineer of Public Roads Administration, with offices in Ogden. R. R. Mitchell is in charge of all Forest and Park Work for the district, and C. C. Stallings was the PRA Resident Engineer on the project.

Active construction work was personally managed on the job by V. C. Mendenhall, assisted by Robert Mendenhall, his contract partner.

For the long pull, there's one best wire rope fastener . . . CROSBY CLIPS. Safe, simple, speedy; applied anywhere by one man with one wrench. *Drop-forged*, not cast. Hot dip galvanized for longer life. Distributors everywhere. Made only by AMERICAN HOIST and Derrick Co., St. Paul, Minnesota.

Industry buys more
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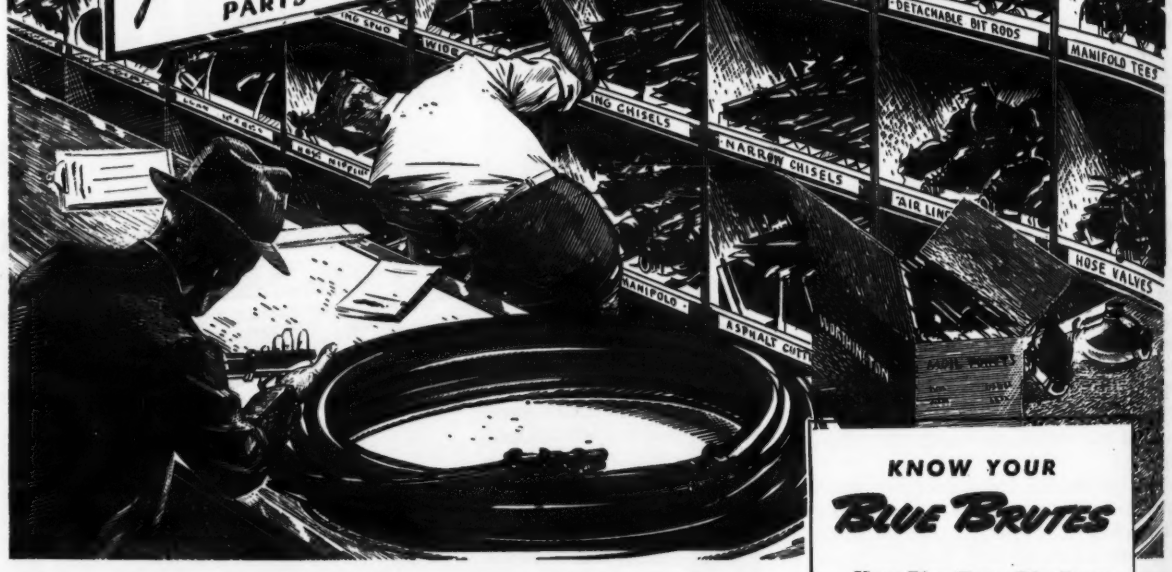
JUST AS TOUGH AS THEIR BIG BROTHERS



You'll find Worthington Accessories as worthy of the Blue Brute name as the Rock Drills, Air Tools, Compressors and other "big shots" in this famous line. Air Hose, Paving Breaker Moil Points and Chisel Bits — Rock Drill Steel and Bits — Line Oilers, Valves, Couplings, etc. — all made to Blue Brute standards and thoroughly tested for the job to be done.

Save time, labor and money. Make sure you're equipped with genuine Blue Brute accessories for all mining or construction work. Rugged, hard working, always dependable, they'll quickly prove to you that *there's more worth in a Blue Brute*.

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WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB

Convention Calendar

Nov. 4-7—Airport Show
National Airport Show and Institute, National Aeronautic Association and Air Foundation, Cleveland Municipal Auditorium, Cleveland, Ohio. Lowell Swenson, General Chairman, 400 Union Commerce Bldg., Cleveland, Ohio.

Nov. 10-13—Steel Institute
Annual convention, American Institute of Steel Construction, Inc., Roney Plaza Hotel, Miami Beach, Florida. Secretary, 101 Park Ave., New York, N. Y.

Dec. 2-5—Highway Research Board
Annual meeting, National Academy of Sciences and National Research Council Bldg., Washington 25, D. C. Roy W. Crum, Director, 2101 Constitution Ave., Washington 25, D. C.

Jan. 26-28, 1948—ARBA Conference
Annual conference, American Road Builders' Association, Washington, D. C. Charles M. Upham, Engineer-Director, International Bldg., Washington 4, D. C.

Feb. 9-12, 1948—AGC Convention
Annual convention, Associated General Contractors of America, Baker and Adolphus Hotels, Dallas, Texas. H. E. Foreman, Managing Director, Munsey Bldg., Washington 4, D. C.

Feb. 15-19, 1948—AED Convention
Annual meeting, Associated Equipment Distributors, Edgewater Beach Hotel, Chicago, Ill. Frank G. Knight, Executive Secretary, 360 No. Michigan Ave., Chicago 1, Ill.

July 18-24, 1948—ARBA Road Show
Road Show, American Road Builders' Association, Soldier Field, Chicago, Ill. Charles M. Upham, Engineer-Director, International Bldg., Washington 4, D. C.

Film on Soil Stabilizer

A full-color sound film of interest to groups active in road planning and building has been made available by the Harnischfeger Corp., Stabilizer Division, 4400 W. National Ave., Milwaukee 14, Wis. Feature of the film is the P&H Single-Pass Soil Stabilizer. It shows and explains the operation of the machine in performing all stabilizing operations in a single pass.

There are scenes from various sections of the country showing the stabilizer at work, using on-the-spot materials. Close-up shots show how the machine shaves and pulverizes the in-place material, blends, applies the liquid, final-mixes, and spreads to a uniform depth. While the picture deals specifically with the making of soil-cement roads, the stabilizer also is shown processing asphalt and native materials.

Those interested in the film for showing at meetings of contractors, highway departments, etc., may secure further information direct from the company. Give the meeting date.

Hydraulic Power Control

Hydraulic power control for snow plows and road machinery is described in a bulletin issued by the Monarch Road Machinery Co., 327-329 Front Ave., N. W., Grand Rapids 4, Mich. The Hy-Lo-Jack finger-tip control is designed to use the power of the engine rather than the muscle of the operator.

The catalog shows how the control can be mounted on the truck dashboard, how it is connected through the fan belt, and tells of several uses for the device. The last page of the folder is devoted to a list of specifications for the control, a description of the Hi-Pressure flexible oil lines, and the Monarch Dyna-Might electrically-powered hydraulic control.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 58.

Lima District Mgr. Dies

G. L. Lillard, Southern District Manager of the Shovel & Crane Division of Lima Locomotive Works, Inc., died August 20 as a result of injuries from an automobile accident. He had been with Lima since 1931.

"After we tackled this road building job we ran into some tough construction work. The going was pretty rugged and, if we were going to keep on schedule, some additional earth-moving equipment was needed—and fast! We knew what was wanted but the cost would put a dent in our working funds so we decided to ask C.I.T. to finance the purchase for us.

"Their representative listened to our story, took down costs, a list of the equipment and how we wanted to pay for it. He worked out the details of a plan by which C.I.T. agreed to furnish 75% of the total and we could repay the loan over 24 months. In less than two weeks the new equipment was at work; we made up lost time and now see no reason why the job will not be completed on time . . . and at a profit."

Situations like this occur every day, and when they do, C.I.T. is ready to go into action, swiftly and efficiently. If you need construction equipment—and would like to conserve your working funds—do as this contractor did; LET C.I.T. FURNISH THE FUNDS TO COMPLETE YOUR PURCHASE. We'll supply any amount needed at reasonable cost and repayment can be arranged to suit your needs.

Any standard make or type of equipment can be financed under this plan and several purchases, made from one or more distributors, can be combined in one easy-to-handle obligation. You amortize the loan through a series of monthly instalments while the new equipment helps pay for itself out of increased earning capacity. Any of these offices will furnish full details upon request.

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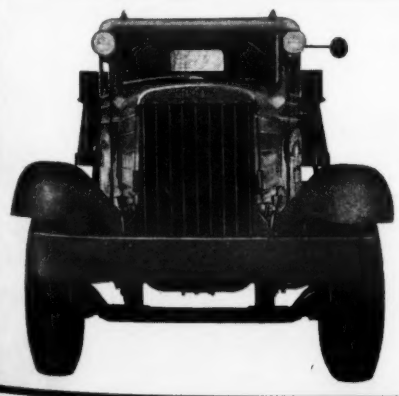

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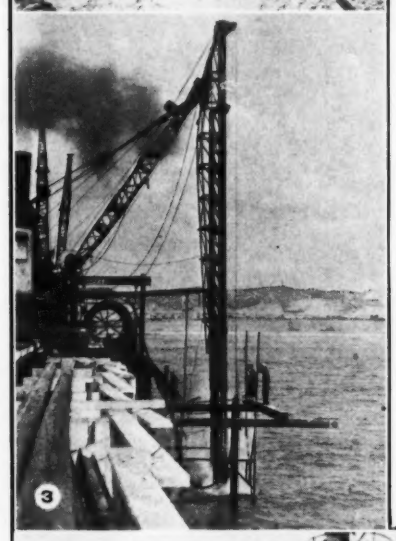


Contractor Whips the Pacific To Build a Mile-Long Outfall

Big 12-Foot Concrete Tube Works Waterfront Ingenuity Overtime as Urgent Sewer Is Built

By RAYMOND P. DAY,
Western Editor

✦ ONE day in July, 1946, a small group of men stood on the beach near El Segundo, Calif. One carried a thin roll of preliminary sewerage plans. Behind them stood high sand dunes. Before them lay the ocean.

One of them, a weather-beaten chunky individual with a ruddy face and gray hair, looked up from the plans to study the ceaselessly pounding Pacific. Great blue-green ground swells swept in, boomed, and broke in a froth of salty white foam against the shore. As far as the eye could see this hazy summer day, the ocean lay unprotected. This man's keen eyes studied its power as a fighter studies his adversary.

Turning to the group, he said, "This won't be easy. But we can do it if we're careful—and lucky."

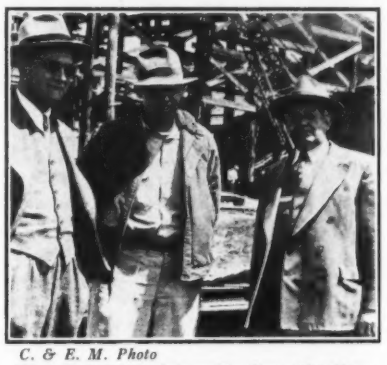
The man who gave the mighty Pacific credit for being a formidable foe was David E. Root, Vice President and Chief Engineer of the Guy F. Atkinson Co., and Manager of its Long Beach district office. Dave Root knows the Pacific waterfront as possibly few other men do. Builder of the Alameda vehicle tube under San Francisco Bay, he is more than passably acquainted with the underwater force of the Pacific. His is an old acquaintance, gained the hard way over a long period of time.

Thus it was, when the City of Los Angeles Bureau of Public Works let a $3,517,410 contract to Guy F. Atkinson Co. on August 7, 1946, for the construction of a mile of 12-foot-diameter reinforced-concrete outfall sewer line near El Segundo, that Dave Root could view this great waterfront undertaking—despite all his years at the game—as a new challenge.

(*Continued on next page*)

(1) The pile driver on the Guy F. Atkinson sewer job moves out towards the end of the work trestle, while a Browning railroad crane follows with a load of steel H-beams. (2) When this picture was taken in April, 1947, the trestle had been pushed 2,300 feet out into the Pacific; it will be pushed out a mile before the job is finished. (3) Using special telescoping leads and a McKiernan-Terry 11B3 pile hammer, the Dreamboat drives a steel H-beam piling for the pipe footing. (4) This Noble plant set up against a high sand dune batches out concrete for the job, while bulk-cement trucks unload at the storage silo. (5) The special transition section, which will join the covered shoreward pipe with the 100-foot sections, was poured just above its final resting place and then lowered. Here workmen rig the lowering tackle and caulk oakum around the rubber gasket. (6 and 7) These two views show the huge steel forms and finished pipe sections, 100 feet long weighing 460 tons each, which are being fabricated 25 miles south of the Atkinson job site at Pier E in Long Beach. The steel forms were built by Willamette Iron & Steel Corp., an Atkinson subsidiary, and shipped by rail to Long Beach. Big as they are, the sections are dwarfed by the seaplane shown in the background.

C. & E. M. Photos



C. & E. M. Photo

The Hyperion job calls for attention from the following officials of the Atkinson firm: left to right, George Atkinson, active President of the company; Superintendent John Morton; and D. E. Root, Vice President and Manager of the Long Beach district office.

460-Ton 100-Foot Pipe Sections Poured Ashore, Launched, and Fitted To Float Behind Tugs

✦ OUTFALL sewer pipe 12 feet in diameter is being poured in sections 100 feet long at Pier E in Long Beach, Calif., about 25 miles south of the Atkinson contract site for the Hyperion submarine outfall.

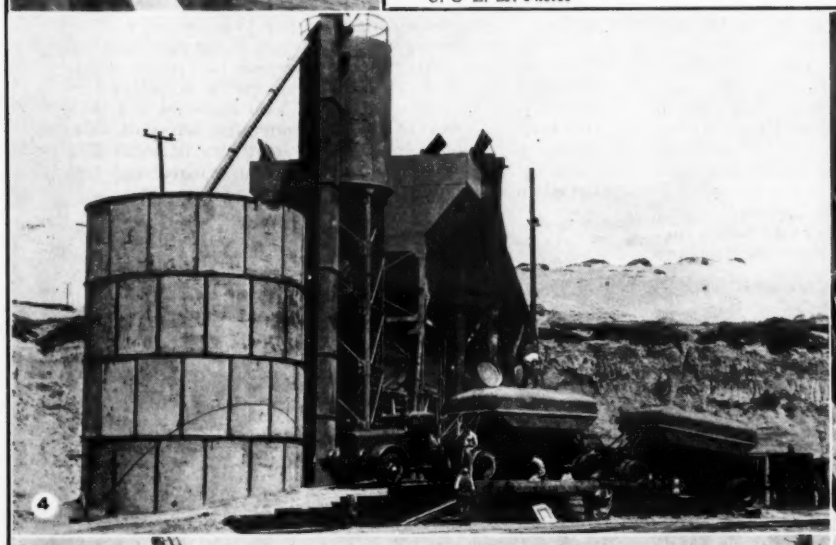
Weighing 460 tons each after manufacture, the huge pieces have to be bulkheaded and fitted with special flotation and leveling tanks before they are launched.

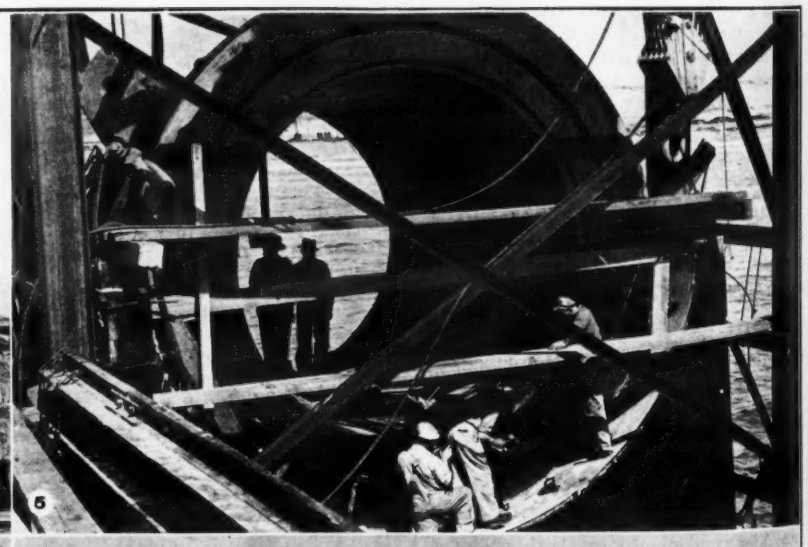
The beach of southern California from Santa Monica to the present fabricating site at Long Beach was very carefully considered, when Atkinson's engineers set up a pouring yard. Pier E was leased because it provided ample pouring room, storage for pipe sections after they were manufactured, and deep water for launching. Once that problem was solved, it remained only to form and handle concrete while pouring the 14-inch pipe walls, loaded heavily with steel.

Steel Pipe Forms Built

Two sets of steel forms were fabricated in the shops of Willamette Iron & Steel Corp., an Atkinson subsidiary, and shipped by railroad to Long Beach. These forms totally enclose the pours.

(*Continued on page* 51)





And certainly, for the time being at least, he has not been disappointed, as we shall see.

New Outfall Badly Needed

The whole history of Los Angeles and its sewage-disposal problem has been rather a sorry story. It has been the story of a great city, growing fast, so overloading its sewage-disposal facilities periodically that raw sewage actually overflowed manholes and ran through the streets. Strangely enough, it has taken just this critical a situation for people in the great city to awaken to the urgency of their problem.

The first sewer in Los Angeles was declared public in an ordinance of 1869. And the first sewer construction was attempted by the City in 1873. By 1887 about 20.6 miles were in the municipal system. In this early day, however, sewage was piped to the agricultural lands south of where Washington Boulevard now runs, and used principally to irrigate citrus and other crops.

When the population had grown to 71,400 in 1894, the first 12.4-mile outfall was attempted. But it deteriorated badly and had to be replaced in 1904 by a 5½-foot-diameter brick and concrete structure, still partly in use and now undergoing substantial repairs.

In 1907 the present central outfall, varying in diameter from 4½ to 6 feet, was placed in operation. But with the growth of the city, it became overloaded. And North Outfall, about 12 feet in diameter, was finally built, together with a fine-screening plant and submarine outfall extending a mile offshore.

Still the city grew, and beaches became more and more populated with bathers. Sewage increased in the outfalls until at present it amounts to some 190,000,000 gallons a day, carrying over 200 tons of solids. Less than 5 per cent of these solids were removed by the screening plant. The rest polluted the beaches for miles in either direction.

As nothing was done about it, the State in 1943 quarantined miles of beaches and brought suit in the Superior Court to abate the nuisance. The Court found for the State and ordered the cities to clean up the entire situation. This has resulted in the financing and construction of a new plant and submarine outfall.

By the time the City had prepared its plans and arranged for state financial aid, construction materials and equipment had reached about their lowest ebb in California construction history. With the need of the job so urgent, the City was forced to ask for completion by November 2, 1947, a date now hard to meet because of early shortages of steel and other equipment. Fighting against time, Atkinson's very work methods have been more or less governed by materials available.

The new outfall will head out to sea about 1,000 feet south of and parallel to the existing outfall line from the Hyperion activated-sludge plant.

Unusually Strong Design

Extending straight out into a sector of the Pacific Ocean unprotected from Santa Monica to Long Beach, the new outfall was designed exceedingly strong. The interior diameter of the tube will be 12 feet throughout. Starting about 400 feet in from the beach, the first 2,224 feet will consist of 12-foot reinforced-concrete pipe sections. These will be covered after they are laid by a concrete encasement 18 inches thick at the pipe soffit and 20 feet wide. Plans to pour these shoreward sections 16 feet long had to be abandoned because of difficulties in manufacture, handling, hauling, and placing.

The seaward end, called the "uncovered" section, will consist of 32 sections of pipe 100 feet long, with 14-inch reinforced-concrete walls. Since they weigh about 460 tons each, the manufacture and handling of these massive pieces has posed some massive and unusually tough heavy-construction problems on land. When Dave Root said "It can be done if we're careful", he was probably thinking about pouring these sections. And when he added, ". . . and lucky", no doubt he thought of what could happen when they put these great concrete pipes in the ocean.

The footing for the pipe in the covered section will consist for 1,550 feet of a continuous reinforced-concrete slab 20 feet wide and 6 feet thick. It will be supported on 222 bents of five piles each, consisting of steel H-beams 14 inches square and 30 to 40 feet long. Each of these piles is being driven to 38 tons of bearing.

Along the uncovered section, the pipe bell sections will be laid on plain-concrete footings 13 feet long, 30 feet wide, and 7 feet thick, supported on 12 steel H-beams 14 inches square. The pipe bell sections are being poured with

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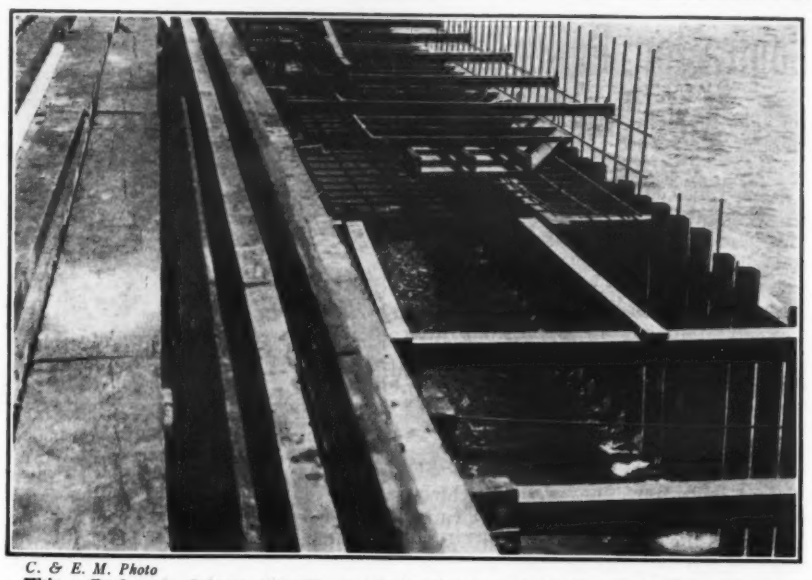

C. & E. M. Photo

This cofferdam is driven adjacent to the trestle to protect the tremie-concrete area and to form the sides of the concrete footing for the sewer pipe. Alternate sheet piles stop at low-tide mark to let the structure "breathe" with heaves of the ocean.

From Contractors & Engineers Monthly for July, 1947

Compaction of Soils Is Conference Subject

ARBA-Sponsored Two-Day Session At Buffalo Covers Practical Methods And Equipment for Soil Compaction; Vibration Is New Development

✦ SOIL compaction and the equipment with which to secure it in embankments, fills, and subgrades, were discussed at a recent conference in Buffalo, N. Y. The two-day meeting was sponsored by the American Road Builders' Association Committee on Compaction of Soils, and the Soils Section of the Joint Committee on Development of Highway Construction Equipment of the Highway Research Board and the ARBA. It was attended by 86 highway engineers, contractors, and equipment manufacturers.

Most interesting of the various sub-

BREAK PAVEMENT TAMP BACKFILL *The Low-Cost Way!*

Compaction of soils has long been a source of grief and controversy among contractors and engineers.

RAPID PAVEMENT BREAKER MACHINES

have proved to be an answer to better compaction at a lower cost!

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Contractor Builds Mile-Long Outfall

(Continued from preceding page)

a large flat lug to rest square upon these footings, and metal straps with steamboat ratchets will hold the uncovered sections in place upon the footings.

As an additional protection from surf action, a permanent steel sheet pile cofferdam will remain in place along the north encasement near the shore. It will also serve as a concrete form while the footing is poured at that point.

All construction hinges on a special 16-foot-long transition section, which will join the short covered shoreward pipes with the big 100-foot sections. Because of the difficulty in transporting a pipe this large from shore, it was formed and poured directly over its resting place on the ocean floor, and then lowered. Until this section could be built, all active work aside from initial preparation had to be held in abeyance.

At the shore end of the new outfall, the invert will be about 15 feet below mean sea level. Grade of the big line will follow the ocean floor reasonably closely, and the discharge end with multiple ports in the last three pipes at the seaward terminus will be 48 feet below the mean low sea level.

It is the designer's answer for the next two decades to the question of how big Los Angeles will become. And how to convert this answer from blueprints to concrete and steel can currently be classified as Headache Number One for Dave Root and John J. Morton, his Superintendent.

Shore Terminal Layout

To insure a well organized flow of materials and supplies to any point on the mile-long outfall, a standard-gage railroad track has been laid from the material storage yard through the steel fabrication yard, past the concrete plant, and on out to the end of the timber work trestle as its construction progresses. A spur line also serves the blacksmith shop, machine shop, framing headquarters, and the pipe storage yard. A service road for automotive vehicles and trucks has also been built.

Office buildings, including an office for inspectors from the City Bureau of Public Works, were also located in the main yard area. This mobilization of men and supplies within a few hundred feet of the water's edge was at least assurance that everything vital to the job could move in fast when men came to grips with the sea.

Trestle Is Built

With great looping ground swells breaking in over the flat beach, floating equipment was not considered safe or dependable. A wood-pile trestle, heavily braced to stand against the waves, was proposed to carry equipment and materials out to various points along the line.

A special pile driver was built. It was named the Dreamboat by imaginative pile butts who, tough as they are, are awed by the magnitude of this job. It has a set of telescoping leads, which carry its McKiernan-Terry 11B3 double-acting pile hammer down under the water to the ocean floor. The rig is hung on the short boom point of a Browning railroad crane with an American 3-drum hoisting engine.

Steam is furnished by an 85-hp upright boiler when the big hammer is being used. When a smaller hammer was used at the start of the work, the boiler on the railroad crane furnished the steam. The flatcar with the 85-hp boiler is generally carried on the seaward end of the trestle between the pile driver and locomotive.

C. & E. M. Photo

Contractor's personnel on the Los Angeles outfall include, left to right, Superintendent John Morton, General Foreman Dick Carscallen, Yard Superintendent Ed Raimer, and Pile-Driving Superintendent Carol Glenn.

From the shoreward end to the transition section, the wood trestle was carried out in 15-foot bents. But from that point on out to sea, bents were spaced one at 13 feet, five at 14 feet, and one at 17 feet. The 17-foot bent will fall adjacent to the joints of the 100-foot pipe sections.

Six wood piles were driven in each bent, and at the time the job was visited for CONTRACTORS AND ENGINEERS MONTHLY the trestle had progressed several hundred feet beyond the transition. Wood piles were sawed off square, capped with a 14 x 14-inch fir timber, and heavily sway-braced and cross-braced above the water line by bolted 3 x 8-inch timbers. The railroad track is carried on 8 x 20-inch fir timber, laid narrow side up, between the bents. Railroad ties are laid crosswise over these timbers, and two spikes through each track plate into these timbers hold down the rails.

A sheet-pile cofferdam was also designed in the overall plan to furnish temporary protection from the sea, and to bulkhead the sides of the concrete-footing pours. Alternate piles in this cofferdam were driven down to the mean-low-tide mark to allow the structure to "breathe" with the undulating ocean. The top of the high piles is 14 feet above low tide. H-beam struts measuring 12 inches are placed on 15-foot centers, with continuous 14 x 16-inch timber wales. This cofferdam, which was the first real operation to be

(Continued on next page, Col. 4)

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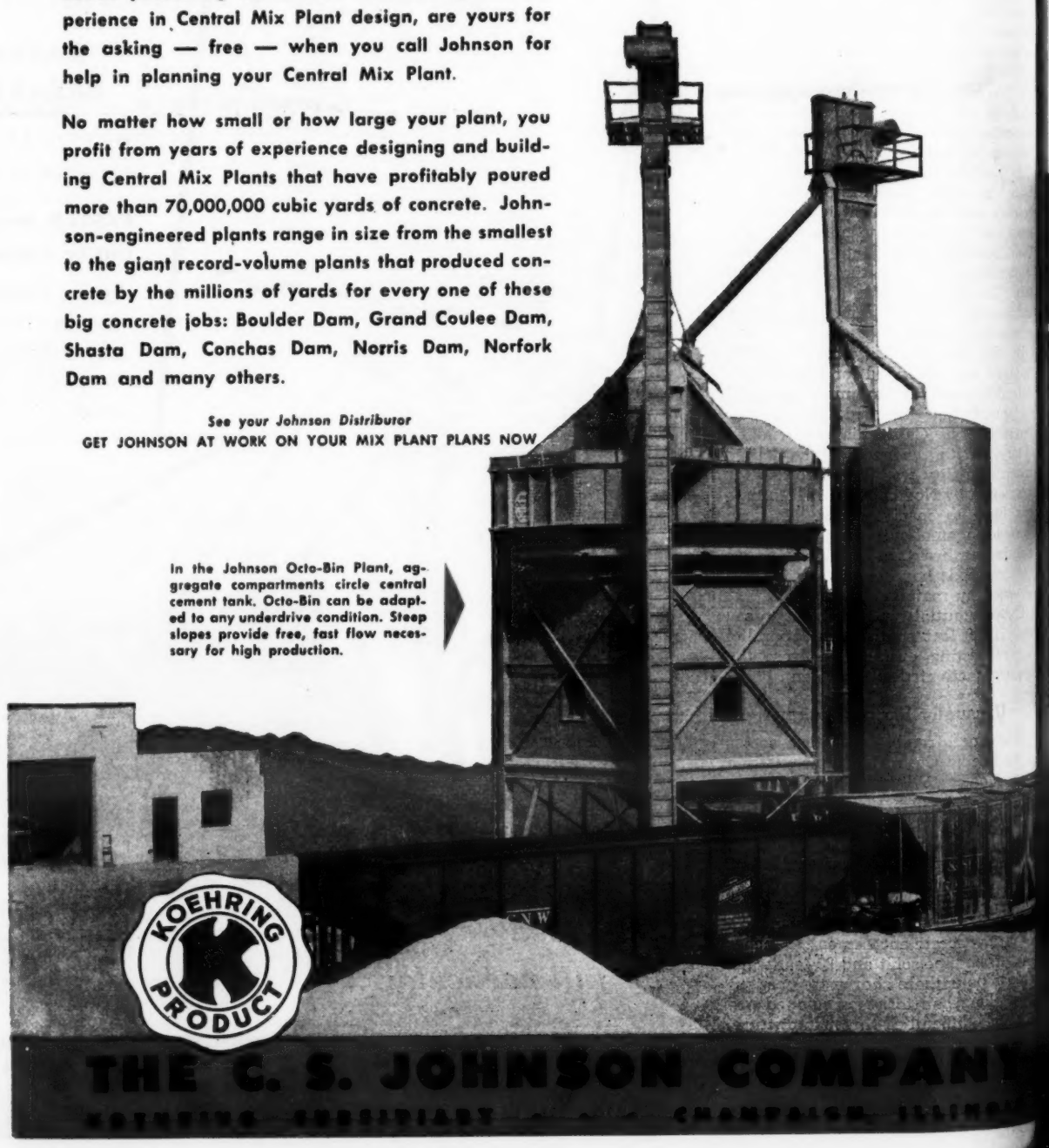
In the Johnson Octo-Bin Plant, aggregate compartments circle central cement tank. Octo-Bin can be adapted to any underdrive condition. Steep slopes provide free, fast flow necessary for high production.



KOEHRING PRODUCT

THE C. S. JOHNSON COMPANY
KOEHRING SUBSIDIARY — CHAMPAIGN, ILLINOIS

Earth-Moving Team Speeds Highway Job

A 4-lane divided highway is rapidly reaching completion near Aurora, Ontario. Part of the new Toronto-Barrie highway, it consists of two 22-foot concrete strips separated by a 30-foot boulevard. The contractor is Peacock & McQuigge, Ltd., of Toronto. The firm was awarded the contract by The Department of Highways of the Province of Ontario.

Part of the credit for the rapid progress goes to the earth-moving team. Equipment includes a Euclid loader, bottom-dump and rear-dump Euclids, a rooter, bulldozer, double-drum sheepsfoot tamper, and one motor grader, equipped with Goodyear Sure Grip and Hard Rock Lug tires.

The borrow pit is well adapted to loader operations. It covers a hillside area of 800 x 600 feet. From five to ten loads are delivered in one pass through the cut, reducing overall time lost in turning at each end. Night crews scarify the borrow pit in preparation for the 10-hour day shift.

A Euclid loader fills 16-yard bottom-dump Euclids in an average time of 48 seconds on the Peacock & McQuigge earth-moving contract for the new Toronto-Barrie highway near Aurora, Ontario.

The silty-loam material weighs approximately 2,240 pounds per cubic yard. The loader fills the 16-yard Euclids in an average time of 48 seconds. Each truck delivers its load to the highway fill at an average of one load every 10 minutes. The one-way haul road is 3,550 feet long. Material is spread in windrows, and the return trip to the loader is made in an average of 30 seconds. The fleet averages 343 trips per 10-hour shift.

Hercules Names Ballard

The Explosives Department of the Hercules Powder Co. has announced the appointment of C. W. Ballard as Manager of the district office at Pittsburgh, Pa.

Contractor Builds Mile-Long Outfall

(Continued from preceding page)

undertaken off the trestle, was driven in 700-foot sections. Steel sheeting was from 45 to 50 feet long when the job was visited.

Early in February, when there was already an impressive showing of trestle and cofferdam built, the great Pacific began to roll, as if resentful of Man's encroachment on its mighty domain. Looping seas 20 feet high unleashed all their power to batter and slap the trestle. Timbers groaned and rubbed. The whole structure rocked. Strong steel bolts snapped with audible reports above the roaring ocean.

A stand-by crew was rushed out on the trestle to replace bolts as they snapped. For ten days Dave Root and John Morton and the men under them watched the slender, flexible, wood trestle take all the Pacific could give. Once a great crashing wave ripped through the end bulkhead section of the steel cofferdam, tearing a grievous hole in the steel piling.

Finally the 20-foot waves subsided, beaten for the first round. When they would come again, possibly with even greater force, no one dared to guess. But February is one of the worst months. They could take hope from the fact that ordinarily the months of June, July and August see the ocean calm. So far, they are quick to point out on the job, their luck is holding.

Driving Steel H-Beams

The 14-inch steel H-beam piles under the footing slab are being slammed down by the Dreamboat at a rate of from 18 to 28 pieces per 8-hour shift. Work is going ahead on a two-shift basis.

Unloaded from trucks at the material yard by an aged Ohio railroad crane, the 14-inch steel piles are first capped by a welder. They are then picked up by a Browning crane, loaded on a flat-car about ten pieces at a time, and hauled out to the pile driver. This crane also unloads the piles and lays them across the railroad track in reach of the pile line from the Dreamboat.

In order to prevent the pile driver from toppling off the trestle when it picks up its 30-ton load of leads, hammer, and pile, a 60-foot steel outrigger is laid down parallel with the track. When the pile driver picks up its load, a steel beam bears down on this outrigger pile, taking a great part of the load.

The H-beams are picked up, set in the leads, and belled in the McKiernan-Terry 11B3 pile hammer. A 4-inch water jet operated by the pile-driver engineer off one of the engine drums is used, with the hammer weight resting on the pile, until it reaches the water line. At that point steam is turned into the hammer, and driving with jetting takes the pile to within several feet of grade. Usually the last few feet of penetration is the result of hammer action, with the water jet removed. A Chrysler-engine-driven Rex centrifugal pump furnishes water for this jet.

It might also be added here that the small amount of grading necessary for the footing is being done by clamshell and pumps, ahead of pile driving.

Tremie-Concrete Footings

Concrete for the heavy footing slab is strictly a railroad show from the Noble batch plant to the pour. The weighing plant has a 500-barrel storage silo for bulk cement, and a 1,000-barrel silo has been added to increase bulk-cement storage. Cement from four sources of supply comes in by truck and railroad. Railroad-hauled

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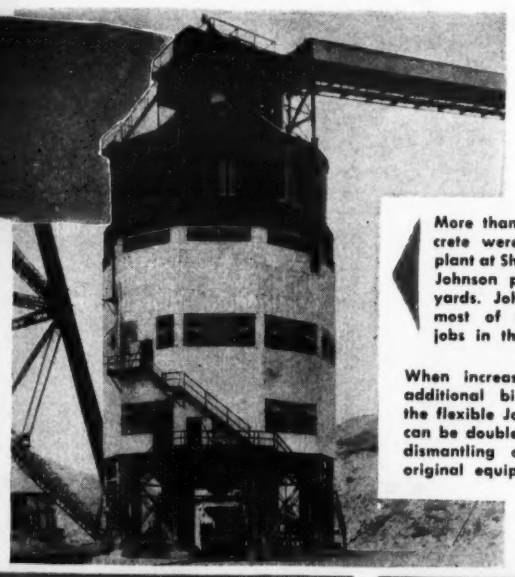

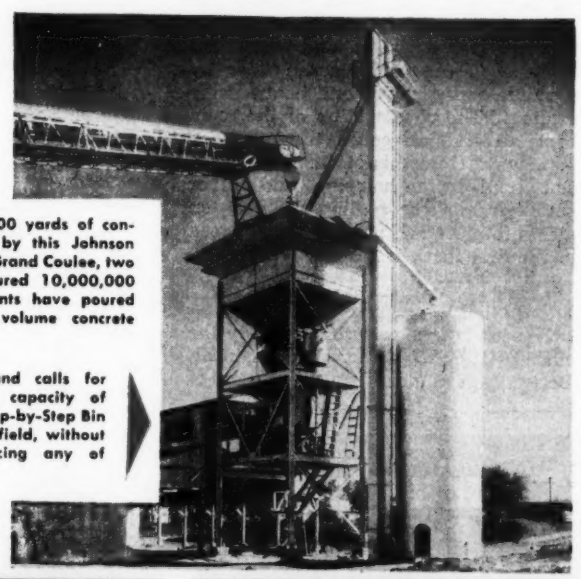

More than 5,000,000 yards of concrete were poured by this Johnson plant at Shasta. At Grand Coulee, two Johnson plants poured 10,000,000 yards. Johnson plants have poured most of the big volume concrete jobs in the U. S.

When increased demand calls for additional bin space, capacity of the flexible Johnson Step-by-Step Bin can be doubled in the field, without dismantling or sacrificing any of original equipment.

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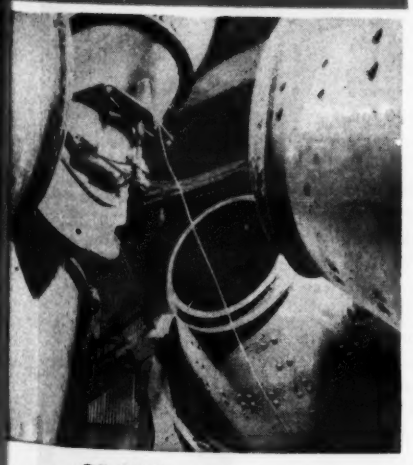

20,000 yards in one 24-hour period

Eight 4-yard Koehring Concentric Zone mixers in the Johnson Central Mix Plant at Grand Coulee poured a record 20,000 cubic yards of concrete in one 24-hour nonstop period, after pouring 5,000,000 cubic yards prior to the record run. From midnight to midnight, these mixers never stopped once.

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PARSONS COMPANY
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Contractor Builds Mile-Long Outfall

(Continued from preceding page)

cement is transferred to bulk trucks and hauled to the plant.

Concrete sand and aggregates, furnished by Consolidated Rock Products Co., are shipped to the El Segundo railroad siding and transferred to dump trucks by a Northwest crane and clamshell. The loaded trucks haul about 3 miles, back up on a ramp over the aggregate bins in the plant, and dump directly without help.

Concrete is batched out rapidly by the Noble plant according to this one-sack formula for footing concrete:

No. 2 rock (2-inch maximum)	97 lbs.
No. 3 rock (1-inch maximum)	72 lbs.
No. 4 rock (pea gravel)	64 lbs.
Sand	251 lbs.
Cement	94 lbs.
Water	6 gals.

Dry batches from the Noble plant discharge directly to two Koehring 34-E concrete pavers, which add fresh water and mix the concrete before dumping it to 4-cubic-yard Gar-Bro concrete buckets. Incidentally, the Atkinson crew has found it a pleasant surprise that nearly 5 cubic yards can be placed in one of the Gar-Bro 4-yard buckets.

Four of these buckets are loaded on a flatcar by the Browning railroad crane and hauled out to the pour. By means of a large steel ring on the end of its load line, the Browning placing crane picks up the buckets and swings them over the tremie hoppers. One diver is generally used on the concrete pours to keep the pours at the proper top elevation.

Prefabricated steel bulkheads are used for the ends of the pour, and removed when the concrete has set up. The reinforcing steel is furnished and bent by Bethlehem Steel Co. and placed under a subcontract with Anthony C. Meehleis of Los Angeles. Reinforcing-steel framework for a pour, 60 feet long, with the timber forms for a top key bolted in place to the steel, is assembled in the yard, hauled to the pour, and set in place by the crane.

Most of the tremie concrete of the future, however, will be placed by an unusual square-topped M gantry. Two legs will ride the trestle rails, with a third leg riding on the outboard cofferdam sheet piling to act as an outrigger. The top transverse rails of the gantry will carry a bridge crane for handling heavy loads.

This gantry will be used exclusively for the placing of 12-foot pipe joints. They are being manufactured by American Pipe & Construction Co. of South Gate, Calif., under a subcontract, brought in to the job by truck, and stored until the special transition section is placed.

When the job was visited, this big special piece had been formed and poured on a special platform, supported by steel H-beam piles, and was ready to be lowered to the ocean floor by multiple-way sheaves and heavy cable rigging. The construction of the main parts of the job could then proceed both ways from this piece. Also, special haul-down hairpins and other paraphernalia for pulling the 460-ton pieces in place had already been placed in the first footings.

Personnel

The job is being administered by the office of Lloyd Aldrich, City Engineer. Design was under the supervision of Col. H. G. Smith, Supervising Inspector, with details by H. A. Wright, Senior Structural Engineer. M. D. McManus is in charge of field inspection, acting under J. F. Burns and C. E. G. Wikoff, Inspector of Public Works.

For the contractor, genial and wise Dave Root is, of course, always present. He frequently visits the job several days in succession to ask Superintendent John Morton, "How's she coming, John?"; to scan the ocean; to get the pungent smell of salt air and bracing timber.

P. N. Fletcher is the Project Engineer for Atkinson, with Ed Raimer in charge of shore work and Carol Glenn in charge of diving and pile-driving work. Dick Carscallen is General Foreman.

A minute taken for safety is better than a month for repairs!

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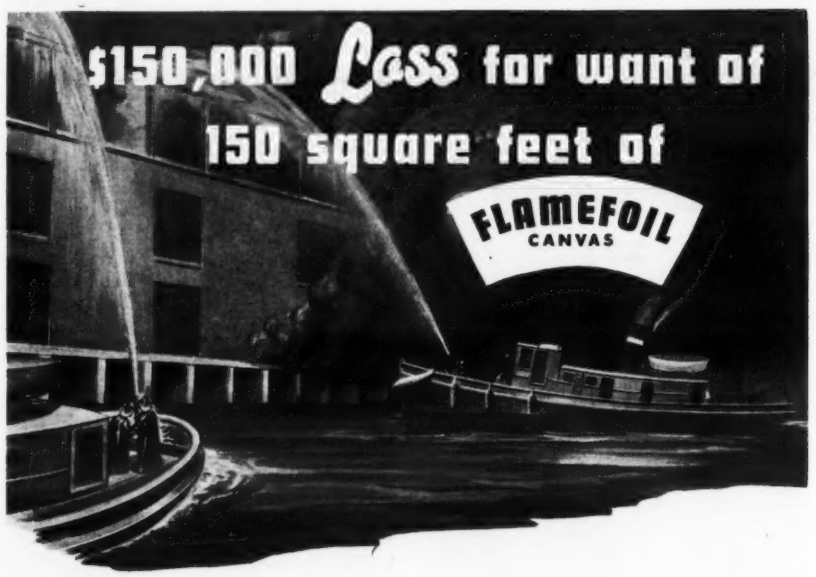

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The MORAL: When Flamefoil Canvas is missing, the fires can rage!

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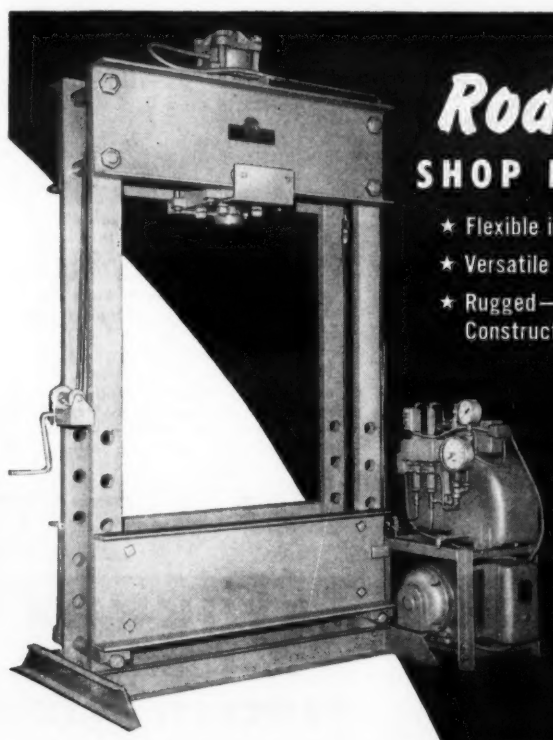
Makers of: Flamefoil Canvas • Flamefoil Fabrix • Flamefoil Beauvan and Flamecote Canvas Finish

Rodgers SHOP PRESSES

★ Flexible in Performance
★ Versatile in Use
★ Rugged—Durable in Construction



Illustrated (left) is the Rodgers 150 ton Stationary Shop Press with extra height, equipped with 2-way Travel Cylinder and "D" Pump with 4-way Valve Arrangement.

The Rodgers "Sixty"—60 ton Shop Press (shown above) takes care of those miscellaneous jobs that waste so much time and labor. Available with hand operated pumps, or with gear head motor drive, also powered with "D" pump power unit.

Rodgers 100-ton Stationary Shop Press powered with 4-Speed Hand Operated Hydraulic Pump, also available with "D" pump power unit. Please note that on all presses the cylinder is movable across the entire width of press.

For tough service and maintenance work in pressing, squeezing and forcing, there is a Rodgers Press to meet your requirements. These rugged, flexible shop presses are available in 60, 100, 150 and 200 ton sizes. (300 and 400 ton capacity presses are available upon special order). They all embody the same proved Rodgers design and performance features: Bolster of press is raised and lowered by a hand crank . . . special alloy steel pins can be adjusted to allow desired opening . . . cylinders may be had with one way travel or two way travel in ram travel lengths from 6" to 14" as desired—frame construction is of strong, durable rolled steel plate. Power is supplied by self-lubricating hand pumps or power driven pumps.

Save time and labor on your jobs with a Rodgers Shop Press—the exact model that is best suited for your needs. You'll get prompt delivery on any standard model press.

* *Send for this catalog giving complete descriptions, illustrations and specifications of Rodgers Shop Presses. There's no obligation. Write today for your copy.*

Rodgers Hydraulic, Inc.

HYDRAULIC POWER EQUIPMENT

7415 WALKER ST., ST. LOUIS PARK MINNEAPOLIS 16, MINN.

Shop Presses — Crawler-Track Presses — Power Pump Units — Portable Presses

Right-of-Ways Mowed At Speeds of 20 MPH

A unit for high-speed mowing of highway right-of-ways, airports, and other uses is available from the Worthington Mower Co., a division of Jacobsen Mfg. Co., Stroudsburg, Pa. The standard model Ranger is designed for low, smooth cuts, from 1¼ to 3½ inches; the Highway Ranger is designed for higher growths and cuts from 3 to 5 inches. The manufacturer states that these mowers can be used at speeds up to 20 mph.

The Ranger attachment is a Worthington triple-gang mower of the Grass Blitzer type. It cuts a 7-foot swath. Mounted on pneumatic tires, it can be attached to most rubber-tired tractors. Transportation wheels and an electro-hydraulic lifting mechanism permit the unit to climb over curbs to mow divided sections and shoulders. The unit can be moved from one mowing job to the next at speeds up to 45 mph.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 97.

Hopper-Car Unloader

A 12-page catalog which describes its device for shake-unloading of bulk materials from hopper-bottomed freight cars can be obtained from the Robins Conveyors Division of Hewitt-Robins Inc., 270 Passaic Ave., Passaic, N. J. The Robins Shakeout is said to unload a car completely in a few minutes with two men operating it—one to manipulate the Shakeout and hoist, while the other opens and shuts the hopper doors.

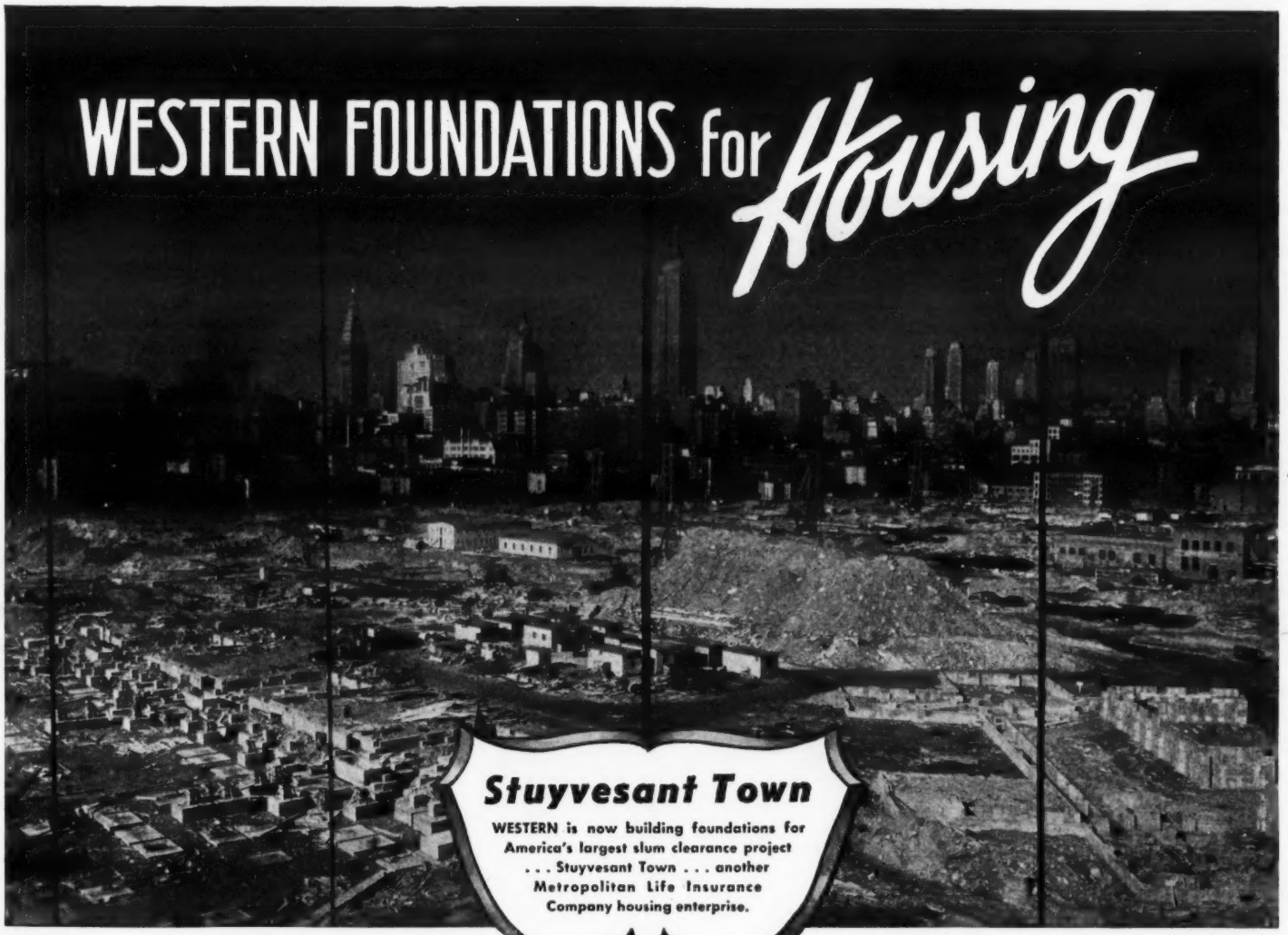
A 2-page spread is devoted to demonstrating that the Shakeout can be handled by any hoist that is able to lift a 5-ton load; photographs show some typical installations. Catalog No. 128-A also reprints excerpts from letters received from owners relating their approval of the Shakeout.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 79.

LeTourneau Staff Changes

Completion of the first phase of its reconversion program has resulted in several changes in its executive staff, announces R. G. LeTourneau, Inc., Peoria, Ill. Roy E. McCluskey has been advanced from Assistant Treasurer to Vice President in Charge of Sales.

The resignation of Oscar W. Nelson as Vice President and General Manager of the Peoria Division has been accepted, upon the completion of his assignment of reconversion and reorganization. Robert F. Nelson has resigned as Vice President and Assistant to the President, but will continue as a member of the Board of Directors.


WESTERN FOUNDATIONS for Housing
Stuyvesant Town
WESTERN is now building foundations for America's largest slum clearance project . . . Stuyvesant Town . . . another Metropolitan Life Insurance Company housing enterprise.

HOUSING JOBS call for speed, speed, speed . . . in addition to lowest cost consistent with competent work and the ability to cope with every type of soil condition. WESTERN simply draws on its extensive experience to meet the speed problem and all the other problems usually encountered in the construction of housing foundations. Although WESTERN usually employs one or more of its six exclusive types of foundations, brand-new variants will be created where necessary to suit your particular job.

WESTERN'S BUTTON BOTTOM PILES are being used in the Stuyvesant Town structures . . . more than 38,000 piles . . . over 1,500,000 lineal feet. They will support 35 thirteen-story buildings which will house 24,000 people . . . a city in itself.

ELSEWHERE IN GREATER NEW YORK, WESTERN has just completed or is now at work on the following housing jobs:

- **RIVERTON HOUSES** — 4101 piles, 174,487 ft. — for the Metropolitan Life.
- **PETER COOPER VILLAGE** — 2262 piles, 81,062 ft. — for the Metropolitan Life.
- **MARCY HOUSES** — 8020 piles, 145,000 ft. — for the New York Housing Authority.

YOUR JOB — WESTERN has successfully handled every job it has undertaken . . . without one single failure . . . some of the toughest and trickiest. Your job is offered the assurance of the know-how gained through this experience. Further, WESTERN is young enough for new ideas; and its principals devote their full attention to every assignment. Ask for our Catalog C and make use of our FREE CONSULTATION SERVICE.

FOUNDATIONS FOR

INDUSTRIAL PLANTS, WAREHOUSES, POWER PLANTS, BRIDGES, PIERS AND DOCKS, STEEL PLANTS, SCHOOLS, COMMERCIAL BUILDINGS, ETC.

WESTERN FOUNDATION COMPANY
308 W. Washington St., Chicago 6, Ill.

WESTERN CONCRETE PILE CORP.
2 Park Avenue, New York 16

Natural Rock-Asphalt Used for County Roads

Large Local Deposits Of Asphalt-Impregnated Rock Make Good Highways Possible at Low Cost

✦ ONE of the most unusual road-building situations in the United States is to be found at Vernal, Utah. Within 5 miles from the center of town are great natural deposits of soft rock-asphalt 40 feet thick, free for the asking.

But there is irony in the situation too, for only now, in 1947, have the first real long-range plans to improve the 1,500-mile Uintah County road system —of which Vernal is the county seat— come to pass. And they are only plans, because Uintah County is desperately poor as highway construction goes; so poor that less than $40,000 a year makes up its total budget. Still, the 12-man County Road Department and the three commissioners are hoping to black-top about 12 miles this year.

The 1,500-mile county road system consists chiefly of graded earth, 20 feet wide in a 66-foot right-of-way. Abundant natural deposits of stream gravel may be found in many parts of this big 4,100-square-mile expanse of mountains and valleys. But only about 20 miles of road have been graveled, and less than 5 miles surfaced with asphalt. Motor graders and trucks cost money, and the County's first need has been equipment to maintain the existing roads.

The situation is now changing—slowly, of course, but steadily. Highway revenues are up ever so slightly, and they will increase over the years as Uintah County resources are developed. Already the U. S. Bureau of Reclamation has plans to develop the upper reaches of Green and Yampa Rivers, and there is great promise of untapped oil resources. Uintah County, in eastern Utah, lies next to the rich Rangely oil fields of western Colorado.

And as the situation changes for the better, three loyal and earnest county commissioners have pledged themselves to support a program designed to improve the existing county road system.

Past Experience Points Way

The commissioners, the road supervisor, several equipment operators, and others have had previous experience with this native material. In fact, about 5 miles have already been built with the meager funds derived from a 2-mill property-tax levy and the County's proportionate share of the registration and gasoline-tax fees.

The streets of Vernal, built with this native rock-asphalt, have carried heavy traffic for eight years. Still smooth, still showing little sign of wear, these streets can be penetrated ½ inch deep by an ordinary pocketknife blade. Sidewalks made from the stuff last exceedingly well—if they get enough pedestrian traffic.

Traffic actually helps this material. Traffic keeps it alive. Traffic keeps the surface smooth and resilient. Traffic helps to keep the 14 per cent asphalt content active and working.

Past Methods

The roads built in the past with this material are in excellent shape, despite a system of producing and laying down the material which now is considered obsolete. Improvements are being carefully considered by Forrest Goodrich, Chairman of the Board of Commissioners, and by County Surveyor Leon P. Christensen. The other two commissioners, Ashel Manwaring and Alma Preece, join with Ross Merrill, Road Supervisor, in agreeing that improvements might be possible.

C. & E. M. Photo
County Surveyor Leon P. Christensen of Uintah County, Utah, examines a piece of native rock-asphalt at the new processing plant.

In the past, the big deposit west of Vernal was uncovered by the Cater-

(Continued on next page)

When Tractor and Equipment are ONE Machine

It's an INTERNATIONAL with Matched Equipment

TD-18 with Isaacson Kable Trac-dozer

TD-18 with Bucyrus-Erie Cable Bullgrader

TD-14 with Isaacson Hydraulic Trac-dozer

TD-18 with Bucyrus-Erie Hydraulic Bullgrader

When you buy an International Crawler and matched bulldozer from your International Industrial Power Distributor you get a completely integrated machine. All the equipment shown in the photographs has been designed by its manufacturer to meet the requirements established by International engineers.

Each bulldozer provides the benefits of its maker's long experience in building earth-moving equipment plus the features that make it an integral part of the International tractor for which it was built.

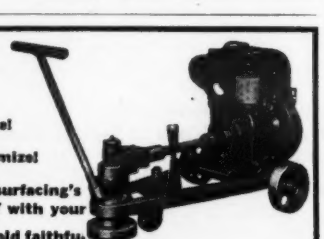
This means that your International Crawler and equipment becomes *ONE efficient machine* for economical, profitable work.

You cannot find a better buy. It's the perfect combination of specialized power and specialized equipment.

Industrial Power Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue • Chicago 1, Illinois

TD-14 with Heil Trailbuilder

INTERNATIONAL POWER
CRAWLER AND WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS



Be wise!
Economize!
Road surfacing's EASY with your Good old faithful

BERG
CONCRETE HI-WAY SURFACER

OLD? Yes! . . . The BERG has been on the market since 1924.
But NEW, TOO . . . . . constantly improved, until today it provides the fastest, easiest, most effective, most economical method available.

The CONCRETE SURFACING MACHINERY COMPANY
4885-4889 Spring Grove Ave. Cincinnati, Ohio

pillar D7 and D6-mounted bulldozers owned by the County, and a truck-loading trap was built of logs and timber farther down a narrow draw. Then on hot summer days, when the sun warmed the black deposit and made the surface soft, bulldozers and a Caterpillar motor grader lightly skimmed the surface off towards the gravity trap. Three dump trucks stood ready to back under this hopper and haul the material to its place of use.

Dumped on the roadway, the material can be bladed off smooth as easily as dirt or road-mix. A steel roller, ballasted with hot water which remained hot all day in summer, was used to iron the material down to its final density.

All parties generally agree there are some disadvantages to this old method. First of all, a great deal of the material was spread along the edges by raking, which caused a little segregation and difference in densities. Nor was the method of laying the mix down, and of rolling, considered to be the best.

Improvement on Methods

Last year, the county pit site was leased by private interests and a large-scale plant was set up to quarry the rock-asphalt, reduce it to a soft mass by steam heat, and to reclaim great quantities of the natural asphalt. One of the arrangements made in the lease consists of an agreement to sell to Uintah County steam-treated asphalt mix for $1.05 per cubic yard f.o.b. plant.

The material will be run through the steam treatment until its characteristics approximate those assumed on a very hot summer day. Then, it is believed, the material can be hauled and spread by means of a standard hot-mix spreader. Laid in this way, with the usual rolling, it is believed a very high-type pavement can be secured.

However, this treatment will run costs up, so the first materials to be used from the plant will be on an experimental basis. The County has wisely opened up a new deposit in the same large vein east of Vernal, and will continue to produce hot-weather skimmings off the pit in the old way, loading the material to a fleet of three new heavy-duty Chevrolets just purchased this year. (Incidentally, the purchase of these three new trucks used almost exactly the millage tax receipts for the year.)

Both types of material will be put down in the standard 1½-inch thickness, compacted, and compared. If the new type of paving is not a great deal better than the improved old type, then of course the more economical method will prevail.

Ross Merrill, Road Supervisor on the Vernal side of the county, estimates on the basis of past performance figures that six Chevrolet trucks, hauling the material 6 miles one way, can surface ¼ mile of 16-foot highway in an 8 hour day. This would figure between $400 and $500 per mile for labor, fuel, and oil. Allowing commercial rates for the motor grader, dozer, and roller, the total cost of this work would be about $1,200 a mile.

Before the roads are surfaced, of course, they will have passed through a transition period of gravel-surfaced treatment. The graded earth, covered by an 8 to 12-inch stream-bed-gravel course, will be exposed to traffic for a year or two. The roads now on the contemplated program have been graveled for several years, and they will be thoroughly dressed by motor graders before the rock-asphalt surfacing goes down.

It is a sort of progressive metamorphosis . . . from cowpath to trail to graded-earth road to graveled thoroughfare and finally to rock-asphalt highway. It is rather fitting this year to compare it to the growth of Utah itself, now celebrating the 100th anniversary of the arrival of the first Mormons. For as the Latter Day Saints took a barren salt plain and made it bloom, so other settlers located in Uintah County and developed it to the point where it is today.

A great deal of work has been done to build the 1,500-mile county road system, despite the fact that road-building funds are desperately short compared to those of counties in more heavily populated states.

Most Travel Is Resident

Uintah County is so situated that most of the traffic on its roads is by residents. While a few transients use the county roads to a very limited extent, most cross-country traffic rolls on the state highway system, chiefly on U.S. 40 which traverses the county from east to west.

County roads run a range of terrain from 8,000 feet high down to about 4,000 feet at the valley floors. However, due to a peculiar climatic condition,

(*Concluded on next page, Col. 2*)

HOT or COLD *Mix Asphalt*

DUST COLLECTORS
AIR WASHERS
ASPHALT TANKS
OIL TANKS
PUMPS

SIMPLICITY ASPHALT PLANTS

FEEDERS
DRYERS
MIXERS
BOILERS
OIL BURNERS

DEPENDABLE

THE SIMPLICITY SYSTEM COMPANY
CHATTANOOGA, TENNESSEE, U.S.A.

POWER and SPEED to Deliver the Load

Under all Road and Traffic Conditions

EATON
2-SPEED
Truck
AXLES

MORE THAN ¾ OF A MILLION EATON 2-SPEED AXLES IN TRUCKS TODAY

EATON MANUFACTURING COMPANY

This Soil Mover comes in three sizes of ¾, 1, and 2-cubic-yard heaped capacity. It dumps its load backwards, and it is hydraulically operated.

Small Earth-Movers

Small-capacity earth-movers in three sizes are made by The Soil Mover Co., P. O. Box 53. Columbus. Nebr. Heaped capacity for the Model No. 50 is ¾ cubic yard; for the Model No. 100, 1 cubic yard; and for the Model No. 200, 2 cubic yards. All three models can be equipped with wheels behind or on the side of the earth cradle.

The Soil Mover unit dumps its load backwards, a feature which is said to improve accessibility to hard-to-reach places. The unit is hydraulically controlled, and will fit most rubber-tired tractors. The Model No. 200 can be used with small crawler tractors. For tractors not hydraulically equipped, a special pump can be supplied.

Model No. 50 has a 42-inch-wide blade; Model No. 100, a 54-inch blade; and Model No. 200, a 72-inch blade. Maximum recommended shearing depth is 2 to 3 inches. Depth of the blade is regulated by a depth gage and the tractor drawbar.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 32.

CO_2-Powered Fire Fighter

A folder describing two of its carbon-dioxide-powered fire extinguishers has been released by the Pyrene Mfg. Co., 560 Belmont Ave., Newark 8, N. J. They are the Pyrene 2½-gallon water-type, and the 2½-gallon anti-freeze type.

These cartridge-operated extinguishers do not require recharging each year. Pressure to power a 40-foot stream is obtained by the releasing of carbon dioxide from a specially built container. The only maintenance required is to check the weight of the containers periodically. After use, the unit is filled with water or anti-freeze solution, and a new carbon-dioxide capsule inserted.

The circular also describes Pyrene Freeze-Proof, an anti-freeze solution. It is said that this compound will make a solution anti-freezing to temperatures as low as minus 40 degrees F.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 62.

Plywood Service Staff

The appointment of Joe Weston as head of its Field Service Department has been announced by the Douglas Fir Plywood Association of Tacoma, Wash. In addition to Weston, the staff consists of Harold Wilson in Washington, D. C., Donald M. Crooks in Chicago, and Harry R. O'Brien in Tacoma.

DIG HOLES SITTING DOWN

The famous Danuser Digger attachment for popular makes of tractors—digs holes automatically — for seedlings, roadside beautification, guard rail-posts, sign posts and fence posts. Dig 500 to 600 holes per day—augers 4" to 18".

Write for literature. Dept. D.

DANUSER MACHINE CO., Fulton, Mo.

Natural Rock-Asphalt Used for County Roads

(Continued from preceding page)

there are few snow problems which the motor graders cannot handle easily.

The use of Uintah County roads by residents is not without some serious problems, however, and money is at the root of every one. Bridges built many years ago for wagon traffic now have to carry heavy trucks. The County, without funds to build new bridges, buys up old drill pipe at 75 cents per foot from the oil fields, welds it together, and makes a sturdy bridge-frame replacement at little cost.

The three commissioners work together in rare harmony and try to consider all problems from a county-wide viewpoint. There is a natural ridge of badlands which separates the western from the eastern half of Uintah County, so the road-building and road-maintenance forces have been split two ways and located on either side of the mountain range.

Ross Merrill, at Vernal, has an Adams motor grader, a Caterpillar D7-mounted bulldozer, and four trucks. Commissioner Goodrich, who takes care of the western part of the county, has a Caterpillar No. 12 grader, a D6 tractor, and three dump trucks. That is the sum of equipment. By hiring a man formerly with a Salt Lake City equipment distributor, and assigning him various repair jobs with which he is thoroughly familiar, the County has cut its equipment-repair costs practically to the cost for parts.

Earth Roads Maintained

Though a 1,500-mile road system is a real job for only two motor graders, they manage to blade the roads more often than one might think. A concerted effort is made to grade the system after each rain. Drainage ditches are cleaned in the spring and, when possible, in the autumn. It is not at all unusual for a graded-earth road to be bladed from six to eight times a year.

The maintenance of gravel surfacing is aimed at keeping enough earth binder and fines with the coarse rock to keep them all in place. During the dry summer months, of course, some of this material may be lost as dust, so immediately after a rain many of these roads are graded to replace the fine material and make the road durable again.

By keeping the payroll to a minimum number of men; by using good equipment and only just enough to get the work done; by starting to use the unusual, big rock-asphalt deposits, Uintah County is getting full value for the few highway dollars it has to spend.

SKF Sales Engineer Dies

George W. Dewees died recently of a heart attack, at his home in Clearwater, Fla. At the time of his death, he was sales and service engineer for the Florida territory of SKF Industries, Inc., ball and roller-bearing firm.

RAINCAP

STOPS MOISTURE FROM FALLING INTO TRACTOR EXHAUST . . Just slip the "RAINCAP" over the open end of your tractor exhaust, and you eliminate forever the danger of moisture falling into the exhaust, injuring your tractor.

THE CAP THAT DOES NOT FORGET TO CLOSE . . Completely automatic—the "RAINCAP" is counterbalanced to open when the tractor starts and close when it stops. Rust proof—made of cast aluminum—can be installed in two minutes. F.O.B. Waterloo, Iowa.

Immediate delivery

Liberal dealer discount

No.	O.D. Exhaust	Price
1	2⅛"	$1.90
2	2⅜"	1.90
3	2¾"	1.90
5	1⅜"	1.90
55	2"	1.90
6	1½"	1.90
66	1⅜"	1.90
7	2½"	1.90
8	3"	2.50
9	3⅛"	2.50
10	3¼"	2.50
11	3½"	2.75
12	4"	3.00

Write Dept. C-1

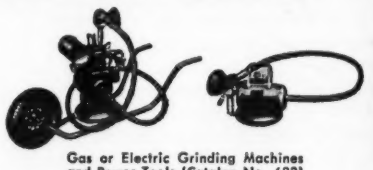
WATERLOO FOUNDRY CO., WATERLOO, IOWA

MASTER COST-SAVING EQUIPMENT—FOR IMMEDIATE DELIVERY

Portable Gas-Electric Generator Plants. Sizes 500 to 17000 Watts (Catalog No. 815-A)

General Purpose Floodlights

Gas or Electric Concrete Vibrators (Catalog No. 689)



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Hand Tools for all Master Vibrators, BIG-3, and Grinding Machines (Catalog No. 683)

"Power-Blow" Electric Hammer and Spade (Catalog No. 688)

Gas or Electric Tampers (Catalog No. 699)

Vibratory Concrete Finishing Screed. Sizes 6' to 36' (Catalog No. 596)

"Turn-A-Trowel" for trowelling concrete Sizes 48" or 34" (Catalog No. 685)

Speedmaster and Cablemaster Hoists; 500 to 6000 lbs. cap. (Export only) (Catalog No. 706-A)

Send for illustrated catalog on any item to

MASTER VIBRATOR COMPANY

DAYTON 1, OHIO

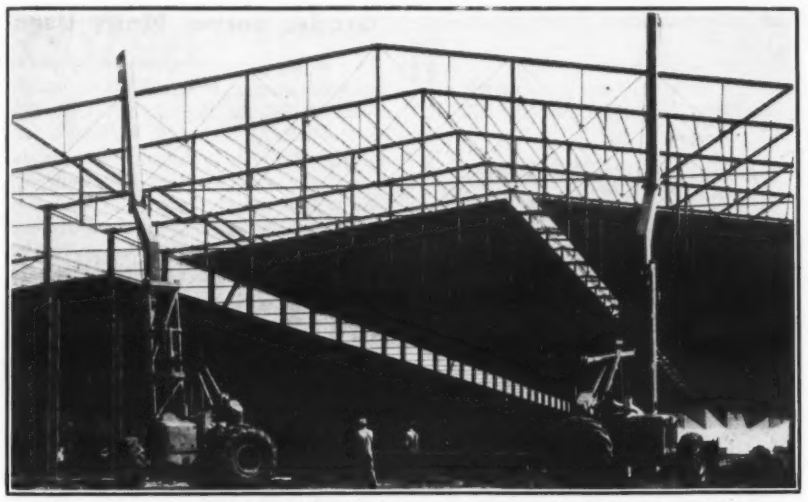
Wheel-Mounted Crane Has Electric Control

One-man-operated, heavy-duty portable cranes are made and marketed by the Longview, Texas, plant of R. G. LeTourneau, Inc. The Tournacranes are diesel-powered and are mounted on pneumatic tires for rapid mobility. The manufacturer states that these cranes, loaded or empty, will travel at speeds of over 20 mph.

All crane operations are electrically controlled from motors fed by a high-capacity generator mounted in line with the engine. One motor raises and lowers the pulley block; one raises and lowers the boom; and a third controls the angle of the boom track. Another electric motor supplies power for the steering of the Tournapull unit. Pivot-turning is said to permit the cranes to make right-angle turns without forward motion.

Featured in the line of LeTourneau cranes is the 15-ton Tournacrane with the C-10 Tournapull. This unit has a maximum lift of 30 feet and a maximum reach of 26 feet behind the rear axle. The lift can be increased over 16 feet by the addition of a boom extension.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 96.



The two Tournacranes in the photo, equipped with boom extension, are designed for a variety of materials-handling jobs, including steel erection.

Earth-Boring Unit Digs 20-Inch Holes

A truck-mounted unit for digging holes and placing poles is made by the Highway Trailer Co., Edgerton, Wis. The Highway Model HD earth-boring machine can be used for digging holes at any angle to the truck. It can be mounted on 1½-ton trucks or heavier. It requires 6 square feet of platform space, and can be equipped with an integral winch and pole derrick.

It is designed and built to dig holes from 9 to 20 inches in diameter, and from 7 to 10 feet in depth, in practically any material but rock. The boring unit consists of a double train of gears, controlled by two multiple-disk clutches and brakes. The drive gear rotates the auger by power, while the feed gear furnishes power to force the auger into the ground while rotating. Control levers are arranged so as to permit the operator to see the auger during drilling operations.

A 2,500-pound-capacity winch and a pole derrick capable of handling poles up to 45 feet in length can be furnished as optional equipment. The winch secures its power from the clutch gears. Power is furnished to the earth-boring unit from the truck engine through a propeller-shaft power take-off, supplied as optional equipment.

Standard equipment includes a 16-inch auger with 5 extra blades and points, a 20-inch auger with 5 extra blades and points; two sets of 8 rack thrust plates, a set of boring machine tools, and a 13-foot rack bar to dig 7-foot holes.

Optional equipment includes an integrally mounted winch and power take-off with a 125-foot winch line, an integrally mounted pole derrick with sheaves, a 16-foot rack bar to dig 10-foot holes, 9-inch auger, 12-inch auger, and platform or ground controls.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 47.

Sales Mgr. for Buda Div.

The Buda Co., Harvey, Ill., announces the appointment of Harry G. Campbell as Sales Manager of its DieseLight Division. This division handles the sale and manufacture of Buda diesel-electric and gas-electric generator sets.

DURBIN-DURCO, Inc.

Manufacturers Certified Specialty Products
Malleable Iron • Drop-Forged • Steel

LOAD BINDER — MALLEABLE IRON
Heat Treated • 5 Sizes
With New, Improved, Reinforced Non-Spreading Mouth

Pat. Pending

		1 Swivel	Wt. Each
MIDGET	No. 1	¼" chain	2¼ lbs.
DELTA	No. 1	5/16 or ⅜" chain	6½ lbs.
		Two Swivels	Wt. Each
DIXIE	No. 1	7/16 or ½" chain	10 lbs.
LONE STAR	1	7/16, ½ or ⅝" chain	14 lbs.
LONE STAR	2	7/16, ½ or ⅝" chain	17 lbs.

LOAD BINDER — DROP-FORGED
Heat Treated • 2 Sizes

Two Swivels
Durbin-Boomer F-1—for ⅜", chain . . . . 10 lbs.
Durbin-Boomer F-2—7/16, ½ or ⅝" chain . 12 lbs.

Other Durbin-Durco Products

COMBINATION ROPE HOIST AND WIRE STRETCHER • Extra Heavy Duty

ALL-STEEL ROLLER BEARING, ROPE HOIST

WOVEN WIRE FENCE STRETCHER
Lever Action, Double Ratchet, Also Worm Gear Type

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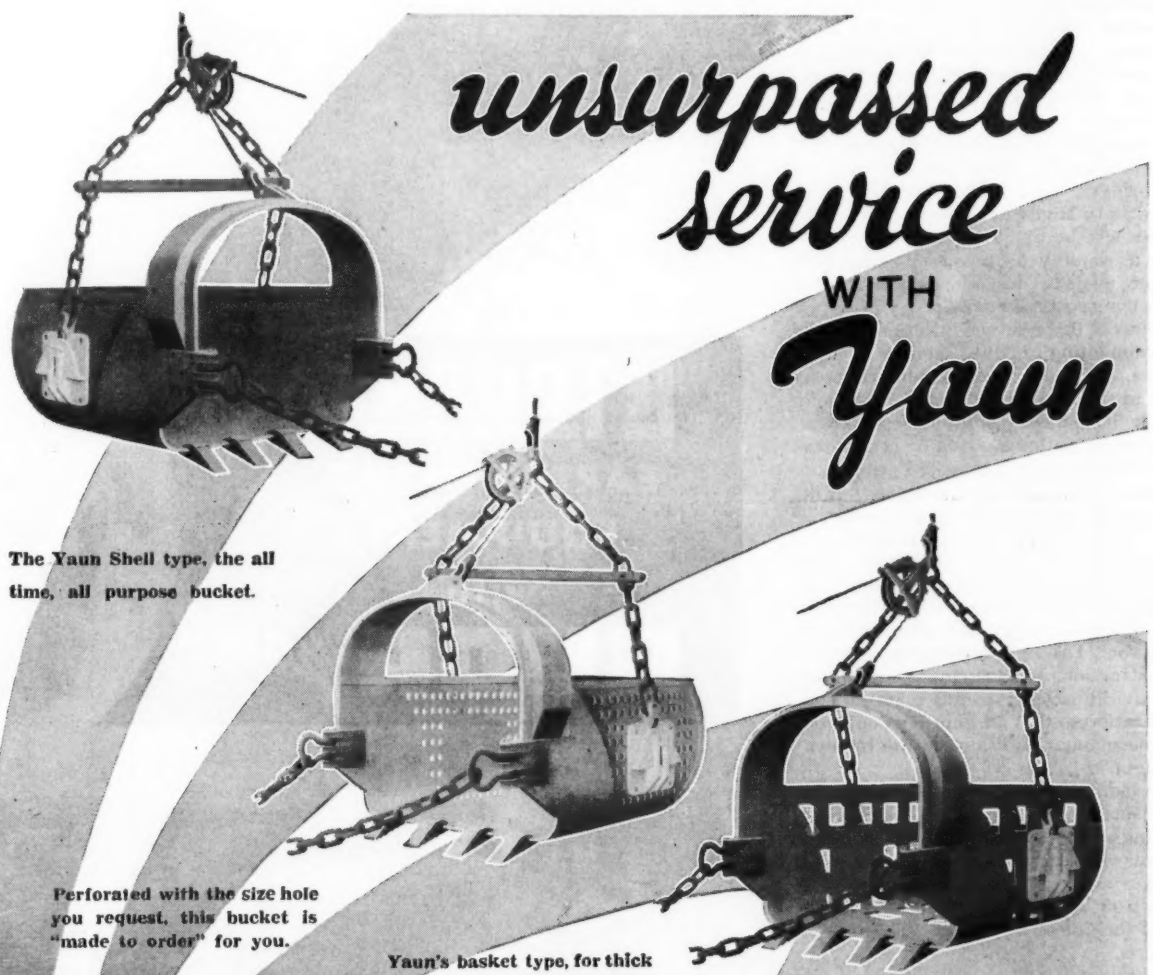
6611 Olive St. Road • St. Louis 5, Mo.

unsurpassed service WITH *Yaun*



The Yaun Shell type, the all time, all purpose bucket.

Perforated with the size hole you request, this bucket is "made to order" for you.

Yaun's basket type, for thick wet, hard to handle material

Ask a dragline operator why he prefers a YAUN. He'll tell you in one word—Service. Yaun means service because it does a job better and faster with less costly operator fatigue. Every trip with a Yaun carries a full load. Precision built, all parts are of manganese steel. Ask the man who uses a Yaun. He'll tell you.

Details and Prices obtainable from dealers or direct from

YAUN DRAGLINE BUCKETS AND MFG. PLANT
BATON ROUGE, LA.

"We stress teamwork on our jobs!"

Report on Vermont's 2-Year Road Program

The State of Vermont has issued a progress report on its highway improvements for the two-year post-war period. In this time, the State has placed under contract or commenced with its own forces 143 miles of road construction and 22 bridges. Total cost for these projects is estimated at $5,068,529; the Federal Government will pay approximately $2,239,498 of this, and the State, $2,829,031.

Projects programmed for the future, comprising 93 miles of construction and 11 bridges, are estimated at $3,811,787. The State Highway Board reports that these will be made ready for contracting as rapidly as possible, along with other projects for which preliminary surveys are under way.

Most of this new construction is aimed at completing unpaved sections of highways. The Vermont State Highway Board feels that as heavier vehicles come into more general use, a gravel surface is no longer safe or economical for even secondary routes. Vermont has placed the stress upon obtaining the maximum amount of improvements. To do this, it has modified its basic construction standards to eliminate extensive relocations and radical grade changes which involve the movement of extremely large quantities of earth and rock. Drainage structures, sub-base construction, and pavement continue to receive the Department's primary consideration so that all improvements may be permanent additions to the highway system.

In addition to Federal-Aid and state projects, the Highway Department is giving special construction assistance to towns in paving their State-Aid highways. Last year, approximately 75 miles of this work was done, and during 1947 the mileage will approach the same figure.

Portable Conveyors For Loose Material

A line of portable belt conveyors in many models is made by the Chicago Automatic Conveyor Co., 1845 So. 55th Ave., Cicero, Ill. They are designed for handling gravel, sand, crushed stone, cement, cinders, and similar materials.

The Cacco Power Mover is a heavy-duty conveyor furnished with either electric motor or gasoline-engine drive. Belts are plain or cleated, according to specifications. The Power Mover has a 4-speed transmission; low and high in each direction. The Cacco belts are made of 4-ply 28-ounce duck, top and bottom rubber-covered, and are said to have a tensile strength of 2,000 pounds. Standard lengths are from 18 to 50 feet, with 18 and 24-inch wide belts.

The Cacco Red Devil conveyors are designed for light-weight portable use. They are made in 20, 22, and 25-foot lengths, and 14 or 18-inch widths. They can be furnished with electric motor or gasoline-engine drives. The Chicago Automatic Conveyor Co. also makes a special line of car unloaders for handling bulk materials from freight-car hoppers.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 27.

Line of Arc Welders

A catalog describing its line of multi-range arc welders has been prepared by the Hobart Bros. Co., Box DM-744, Troy, Ohio. This 4-page catalog features a description of controls available for use with Hobart welders.

Models pictured and described in the folder include the electric-powered ac transformer type; the dc-type motor-generator sets, made in sizes ranging from 150 to 600 amps; the dc-type generator for hooking to available power source, made in 150 to 400-amp sizes; the Hobart Weldmobile; and the gasoline-engine-powered unit mounted on a pneumatic-tired trailer.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 80.

Grader Serves Many Uses

An 8-page catalog describing its No. 8 motor grader is available from the American Road Equipment Co., 2319 No. 18th St., Omaha 10, Nebr. Feature of the catalog is a double-page spread showing a side view of the unit, and listing its specifications.

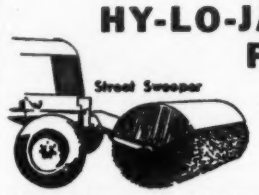
The catalog has many photographs of the American No. 8 in action in various operations, such as road-building, maintenance, and ditching, as well as showing the chassis and its features of construction. The last 2 pages depict the No. 8 in use with some of the available attachments. These include a hauling scraper, a snow plow, scarifier, standard cab, drawbar, and others.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 63.

Let HYDRAULICS lift your equipment

use the **MONARCH**

HY-LO-JACK FAN BELT DRIVEN **POWER HYDRAULIC CONTROL**



Lifts equipment ten times faster than hand pump. Easy installation on new or existing equipment. Hundreds of applications, such as Snow Plows, Sweepers, Power Mowers, etc. Priced for the most conservative budget.

WRITE FOR CIRCULAR H.75

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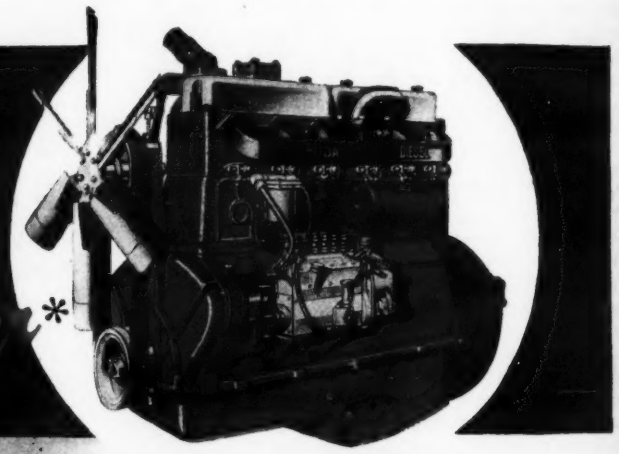
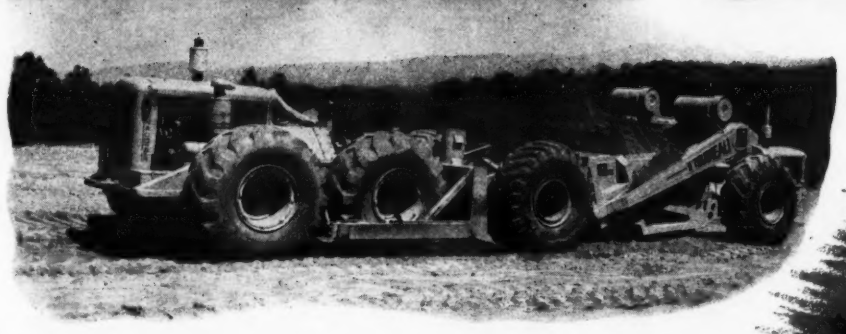
MONARCH ROAD MACHINERY COMPANY. 327-329 Front Ave., N.W., Grand Rapids 4, Michigan

a profitable combination

LETOURNEAU

EARTHMOVING EQUIPMENT with **BUDA** *power*





☆ HIGH TORQUE
☆ EASY STARTING
☆ SLOW-PRESSURE COMBUSTION
☆ LONG LIFE
☆ LOW UPKEEP
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PLENTY of power when the scraper or dozer digs in . . . high speed for the long hauls . . . fewer pounds per horsepower for less dead load and greater pay load . . . dependability that keeps equipment going until the job is done . . . low fuel consumption . . . plus a complete modern line of dependable engines—are a few of the reasons why LeTourneau is using BUDA Engines in their newly designed equipment. Write for new BUDA literature giving complete data.

WORLD-WIDE SERVICE AND PARTS

*LeTourneau's new Tournapull Models B31, C9 and D-6, and Tournadozer Models B and C, and other models to be announced later, are equipped with BUDA Engines as standard equipment.

BUDA Construction Engines—Diesel, Gasoline, Natural Gas, 5 to 340 Horsepower . . . Generator Sets 2.5 to 125 K. W.

BUDA

the engines that Experience built...

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HARVEY *(Chicago Suburb)* ILLINOIS

Stone Base Course Laid Over Old Road

Bladed by Grader Then Rolled; Surfaced With Bituminous Cover Coats; A Maintenance Job

• THE Illinois Division of Highways rebuilt a 5.6-mile stretch of crushed-stone road, F.A. 140, this summer between Taylor Springs and Coffeen in the southern part of the state, with the state reconstruction organization. The existing 22-foot bituminous-surfaced road had become rough and broken from troublesome subgrade conditions. The rich, black, prairie land of downstate Illinois is ideal for growing wheat, corn, or beans, but presents difficulties when used as a highway foundation. In a few bad places the old surface had to be completely replaced with crushed stone, but for the most part the improvement was made right on top of the old road.

The new stone base course was laid to a compacted thickness of 4 inches. It was rolled with sheepsfoot, steel-wheel, and rubber-tire rollers to achieve the desired compaction, while continuous passes with a motor-grader blade kept the surface smooth. It was then primed and given two bituminous cover coats of stone chips and asphalt. The job started on May 13 but a rainy summer delayed the completion of the work until August.

Laying the Base Course

No change was made in the existing 36-foot width of roadbed composed of the 22-foot pavement flanked by 7-foot shoulders. However, the new stone base was permitted to feather out for about 3 feet on each side of the original pavement, thereby also stabilizing that amount of dirt shoulder.

Crushed stone was obtained from two sources: Columbia Quarry at Krause, Ill., and the East St. Louis Stone Co., at Falling Springs, Ill., both places about 75 miles distant from the project. The material was shipped in hopper-bottom cars to a siding of the New York, Chicago & St. Louis RR at Coffeen, the lower end of the job.

There it was unloaded by a Pioneer conveyor belt, 22 inches x 30 feet, driven by a Le Roi gas engine; the belt had formerly been used on a crushing plant. Unloading was done directly into trucks, 10 being the average number used on the job. The trucks were rented by the hour and were of various makes, but all carried from 5 to 6 tons of stone.

If necessary, water was added on the way to the road as the trucks stopped at a bridge crossing a creek. A 2-inch pump drew water from the stream and a man stationed at the bridge wet down each truck with a hose. Keeping the stone wet meant that much better compaction could be obtained later with the rollers.

When the trucks reached the road they backed up and dumped into a shop-made wooden spreader box 8 feet wide. It was pulled down one side of the road by a Caterpillar RD7 tractor to which it was attached by a double cable. This cable was kept about 75 feet long so that the tractor would not be in the way of the trucks as they maneuvered into position to dump their loads. As the spreader box was pulled along, the stone was laid out in a neat windrow 8 feet wide x 10 inches deep. When about 500 feet of windrow was laid out in this fashion, the operation

(Continued on next page)

C. & E. M. Photo
An Austin-Western 99M power grader blades a stone base course on a road in southern Illinois, as a Huber 3-wheel 8-ton roller compacts it.

Shunk Snow Plow and Ice Removal BLADES
Proved record of superior performance. Made of specially developed steel to withstand severe service conditions.
FOR ALL TYPES AND MODELS OF SNOW PLOWS
Various widths, lengths, thicknesses--flat or curved--standard or special--punched ready to fit your machine.
SHUNK SAW-TOOTH ICE BLADE
Amazingly effective. Thoroughly breaks up and removes heavy, slippery ice and snow formations. Replaces all types of snow plow blades or maintenance units. Write for Bulletin and name of nearest Distributor.
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MANUFACTURING COMPANY
ESTABLISHED 1854
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THIS ONE FACT TELLS YOU MORE ABOUT ATLAS SPEED FORMS THAN ANYTHING WE CAN SAY!

OF ALL THE CONTRACTORS WHO RENTED ATLAS SPEED FORMS IN A 12-MONTH PERIOD

...92% BOUGHT THE FORMS THEY RENTED

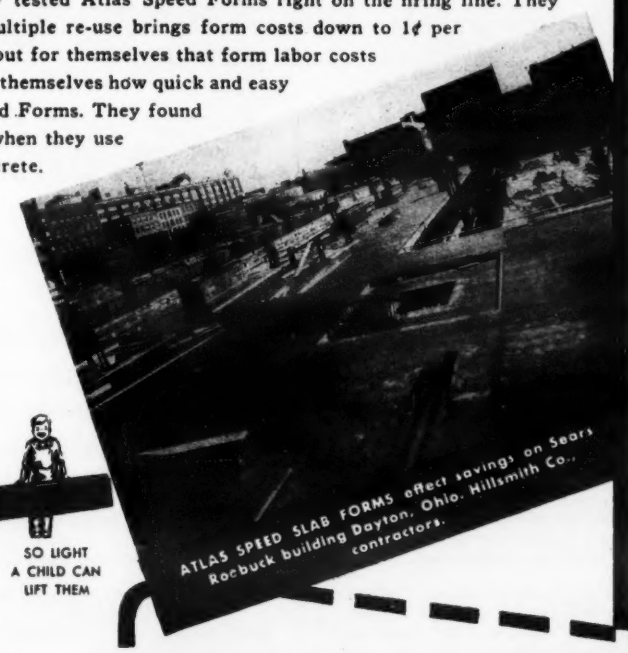
True, we have a liberal rental purchase plan – at any time within 60 days the rental fee can be applied against the purchase price but that's not the story.

Here were 300 experienced contractors, pouring concrete, working in a competitive market, faced with the same sort of costs, time and labor problems that you meet.

These 300 contractors actually tested Atlas Speed Forms right on the firing line. They found out for themselves that multiple re-use brings form costs down to 1¢ per contact foot per use. They found out for themselves that form labor costs are cut in half. They found out for themselves how quick and easy it is to erect and strip Atlas Speed Forms. They found out that they make more money when they use Atlas Speed Forms for poured concrete.

These 300 contractors sold themselves on Atlas Speed Forms by actually using them. Don't you think you should at least find out how they can save time and money for you? How they can eliminate a good many of your headaches?

Send in the coupon and we'll send a data sheet and give you a form estimate and more detailed information.



*ATLAS SPEED FORMS are standard forms for pouring concrete walls, floors, and foundations. Also for bridges, tunnels, caissons, pipes, sewers. There's an Atlas Form for every purpose and Atlas experts will be glad to advise on all concrete forming problems.

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Stone Base Course

(Continued from preceding page)

was repeated on the other half of the road, the two windrows meeting along the center line.

Next, an Austin-Western 99M power grader with a 12-foot blade set at a 45-degree angle struck each windrow from the outside, moving the stone into one triangular-shaped windrow that ran down the center line of the road. Then half the windrow was moved out over one-half of the road, and the same thing done on the other side with the remaining stone. Water was added from the spray bar on a 2,500-gallon tank truck. Water was taken from city hydrants in Hillsboro, just north of Taylor Springs at the upper end of the job.

As the stone was spread, rollers gradually compacted the material. A sheepsfoot roller was used to get the initial compaction. But most of the rolling was done with both a Huber 8-ton 3-wheel roller and a Bros pneumatic-tire roller, 4 wheels in front and 5 in the rear, pulled by a John Deere rubber-tired tractor. The combination of blading and rolling the moistened stone resulted finally in a 4-inch thickness of stabilized crushed-stone surface shaped to a 3½-inch circular crown, laid over the old road. The gradation of the crushed-stone base-course material is as follows:

Sieve Size	Per Cent Passing
1-inch	100
½-inch	60-90
No. 4	40-60
No. 8	25-50
No. 16	20-40
No. 200	5-15

C. & E. M. Photo

This Bros rubber-tire roller with 4 wheels in front and 5 in the rear, pulled by a John Deere rubber-tired tractor, compacts stone base course on 5.6 miles of road between Taylor Springs and Coffeen, Ill.

Bituminous Cover Coats

The base course was primed with MC-O applied at the rate of 0.3 gallon to the square yard. All the bituminous material was obtained from the Shell Oil Co., which shipped it in tank cars from the refinery at Wood River, Ill., to a siding of the Big Four RR (C.C.C. & St. Louis) at Taylor Springs, at the upper end of the project. This distance is only about 45 miles, so the tank cars did not have to be reheated on arrival; they were pumped directly into an Etnyre 1,500-gallon distributor mounted on a semi-trailer pulled by a Ford tractor. Loading was done with the pump on the distributor. Half the road was primed at a time, and this was left to cure at least 24 hours and until it would not pick up.

The first cover coat consisted of a shot of MC-5 applied at the rate of 0.22 gallon per square yard. The full width of the road was done at one time while traffic was held up for about 10 minutes. It was covered with stone chips spread on at the rate of 24 pounds per square yard.

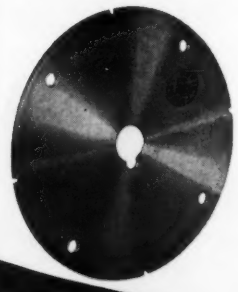
The chips were supplied by the Columbia Quarry, shipped to the Coffeen siding, and loaded into the trucks with the conveyor belt. On the road they were distributed from a Buckeye spreader box with an 11-foot

(Concluded on next page)

Specify

BEVIL

TOMORROW'S Concrete Cutting Wheel



Ready TODAY!

Bevil Diamond-Abrasive Concrete Cutting wheels are specifically engineered and built for concrete cutting. They contain high diamond concentration, have heavy bodies and other special structural features required for concrete cutting. Under competitive tests they have produced the lowest consistent cutting cost per lineal foot of any concrete cutting blade on the market.

Bevil Diamond-Abrasive Concrete Cutting Wheels are made in 8", 10", 12", 14", 16", 18", and 20" sizes. Immediate delivery on 8", 10", 12", and 14" wheels.

Ask your concrete cutting machine dealer for Bevil Concrete Cutting Wheels. Look for the Bevil trade mark. It designates TOMORROW'S concrete cutting wheel, ready TODAY! *Standard equipment on Cutcrete Concrete Cutting Machines.*

MUSTO-KEENAN CO.

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BEVIL DIAMOND-ABRASIVE CUTTING TOOLS

in a BALANCED Earthmoving Team

What's the performance tip-off on a *balanced* earthmoving team?

Watch a Bucyrus-Erie Bullgrader-International crawler tractor combination for the answer! Note how this combination unit sweeps through the cut with smooth, even action, without gouging, nosing down, jerking or stalling. See how the tractor tracks work full length on the ground, without wasting traction "pulling against air". And, most important of all, check into the output and note the superiority there.

Bucyrus-Erie Bullgraders and bulldozers are so carefully designed to fit International crawler tractors that these tractors retain all of their operating characteristics and effectiveness. The weight of the equipment and the digging loads imposed are properly distributed to give you full advantage of all the power furnished by the tractor. This means more power at the blade, more dirt moved, less fuel burned. It also means lower repair costs, because even distribution of track roller loads prevents excessive wear and strain on tractor front idlers and rollers.

Your International Industrial Tractor Distributor will gladly give you the full story on these balanced earthmoving teams. Ask him about them —and about the complete line of Bucyrus-Erie tractor equipment as well. Bucyrus-Erie Company, So. Milwaukee, Wisconsin.

72T47

See Your INTERNATIONAL Industrial Tractor Distributor

For BUCYRUS ERIE Balanced Tractor Equipment

opening, which was hooked onto the back of the trucks. The trucks backed down the road, spreading the chips, to avoid running over the bitumen. The chips were rolled in with the smooth-wheel roller at once, and the next day a broom drag was pulled over the surface by the rubber-tired tractor. This helped to work in any of the stone chips that were thrown up by traffic.

The same procedure was followed in laying the second cover coat. This time the MC-5 was applied at the rate of 0.23 gallon to the square yard, but the stone-chip cover was the same, 24 pounds to the square yard. The road was completed with the rolling and final broom drag. The gradation of the stone chips used in the cover coat is as follows:

Sieve Size	Per Cent Passing
½-inch	100
⅜-inch	60-90
No. 4	0-15
No. 10	0-5

Quantities and Personnel

Members of the state organization, averaging 30 in number, were hired locally for the job. The major items involved in the 5.6-mile improvement included:

Crushed stone for base course	17,966 tons
Bituminous material, prime	27,690 gals.
Bituminous material, cover coats	32,600 gals.
Cover-coat aggregate	1,630 tons

W. W. Polk is Chief Highway Engineer for the Illinois Division of Highways. The job is located in the Eighth District of which A. W. Wand is District Engineer with headquarters at East St. Louis, Ill.

State's Grass Formula For Seeding and Sodding

Information on seeding and sodding as practiced by New Hampshire has been supplied by L. B. Morrill, Supervisor of Highway Marking of the New Hampshire Highway Department. In that state, a large part of the roadside program has been aimed at stabilization as well as improved appearance of slopes resulting from cuts through hilly terrain. Few legumes are used on shoulders and slopes.

Specifications for the grasses used successfully by the State are: 40 per cent timothy, 98.5 per cent purity, 90 per cent germination; 40 per cent redtop, 92 per cent purity, 90 per cent germination; 10 per cent orchard grass, 80 per cent purity, 85 per cent germination; and 10 per cent white clover, 80 per cent purity, 90 per cent germination.

These grasses are used in conjunction with trees and shrubs, natural and hardy in that zone. Specifications for establishing grasses on slopes consist of the use of pegged sod strips placed approximately 4 feet apart on 4 inches of loam. Between these strips, 6 inches of loam is spread, graded, and seeded.

Soulé to Handle Schramm

The appointment of the Soulé Equipment Co. as distributor for the full line of Schramm compressors has been announced. Soulé will cover northern California from its home offices at 760 Ferry St., Oakland, Calif.

Equipment Needs for '48

State, county, and municipal governments will require approximately $240,000,000 worth of equipment for maintenance work next year, according to officials planning the July, 1948, Road Show. They estimate that another $265,000,000 worth of equipment will be required for new construction. And an additional $150,000,000 worth of equipment will be needed to bring construction-equipment inventories up to normal.

The American Road Builders' Association Road Show will bring together the manufacturers of this equipment and those interested in buying it. Purchasers will be able to see what machinery is available, and which machines will best suit their purpose. Manufacturers will be able to demonstrate the newest machinery developments and to show them in action.

FASTEST CUTTING, MOST RUGGEDLY BUILT CHAIN SAWS ever made

Close-to-ground felling

Bucking—top or inverted limbing at all angles

All kinds of timber cutting

...now at new LOW PRICES

DISSTON CHAIN SAW with Mercury Gasoline Engine

11 h.p., 2-cylinder engine. Sizes: 24" to 84"

For fast, dependable performance—in timber cutting of every kind—the Disston Chain Saw is outstanding. It's a portable, easy-to-operate, two-man, self-contained unit for use in forests and parks; on tree service, railroad and contracting work; at shipyards and manufacturing plants—wherever there are trees to fell and buck or timbers to cut.

The Disston Chain Saw is built for long, hard service and low cost operation. It delivers more horsepower per pound of weight, and is manually controlled to utilize full engine power under all cutting conditions.

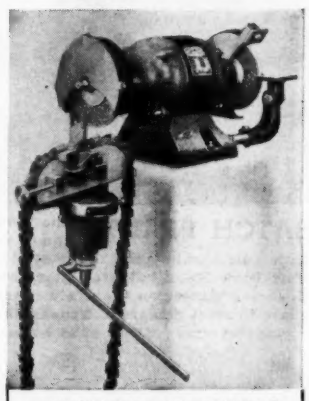
Among its many outstanding features are the two cylinder, 11 h.p. engine; positive-acting, non-slip, multiple-disc clutch; the detachable air cleaner; and the tough, durable cutting chain of Disston Steel. It's a product of Disston saw making skill and dependability . . . a typical example of the economy of Disston quality.

IMMEDIATE DELIVERIES

DISSTON CHAIN SAW—PNEUMATIC

3½ and 5 h.p. motors in 24" and 36" sizes. The 3½ h.p. motor requires 90 cu. ft. of air per min.; the 5 h.p., 150 cu. ft. per min. Each operates at 90 p.s.i.

A powerful, light weight, air-driven saw that can be operated wherever compressed air is available—even under water or where explosive vapors are present. Many are in use by railroads, contractors, shipyards, utilities and industries of various kinds. It is ruggedly built, well balanced and easy to operate from any cutting position and on woods of every kind. Equipped with heavy-duty, vane-type motor, specially engineered and produced by Chicago Pneumatic Tool Company for use on Disston Chain Saws. Requires little maintenance as it is built for long, economical service.



DISSTON ELECTRIC CHAIN SAW SHARPENER

Enables you to do your own sharpening . . . quickly, easily, accurately. Keeps chains in first class condition.

Write for further particulars, or see your Disston Distributor

HENRY DISSTON & SONS, INC., 1074 Tacony, Philadelphia 35, Pa., U. S. A.

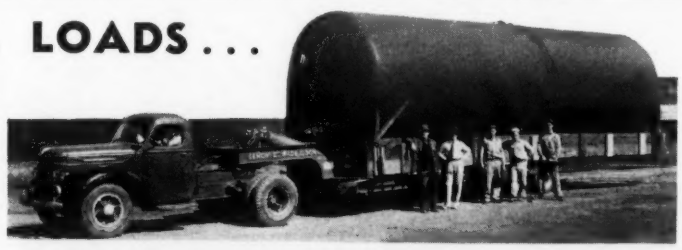
COMPLETE STOCKS OF PARTS AND QUICK SERVICE THROUGHOUT THE COUNTRY

SAFE FOR UNUSUAL LOADS . . .

It takes a sturdy, well-designed and properly constructed trailer to safely transport unusual and unbalanced loads. Heavy hauling is ALWAYS SAFE with a JAHN TRAILER.

JAHN TRAILERS ALL OVER THE WORLD

—Reg. Trade-Mark



Heavy-duty trailers from 5 to 100 tons with any wheel or axle combination.

C. R. JAHN COMPANY

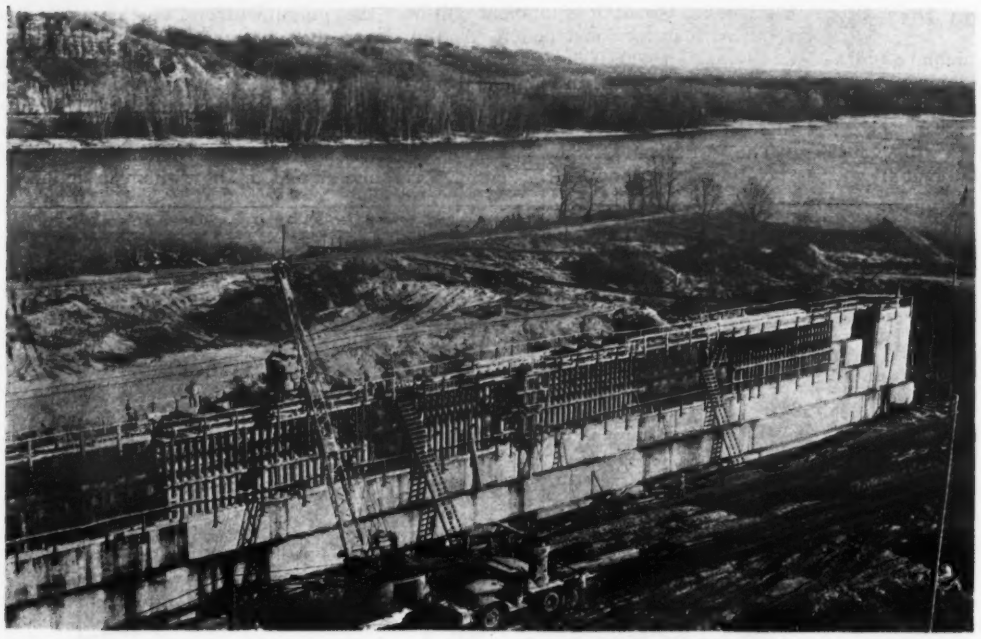
Dept. 1347, 1106 W. 35th Street, Chicago 9, Ill.

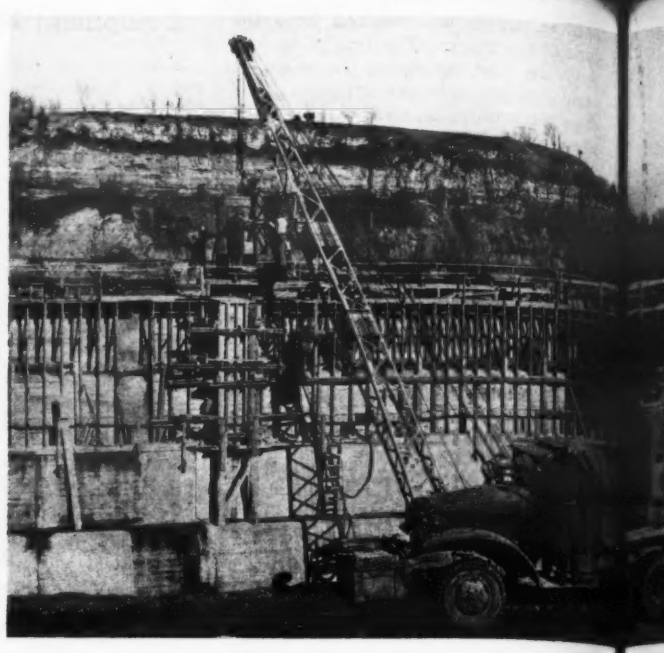
Tournapull For Sale

Model TC-30, Serial #C-2320 Powered by Caterpillar Diesel 48-hp. motor. With Tournacrane 30' boom. Practically new. Priced to move.

THE PERFECTION STEEL BODY CO.

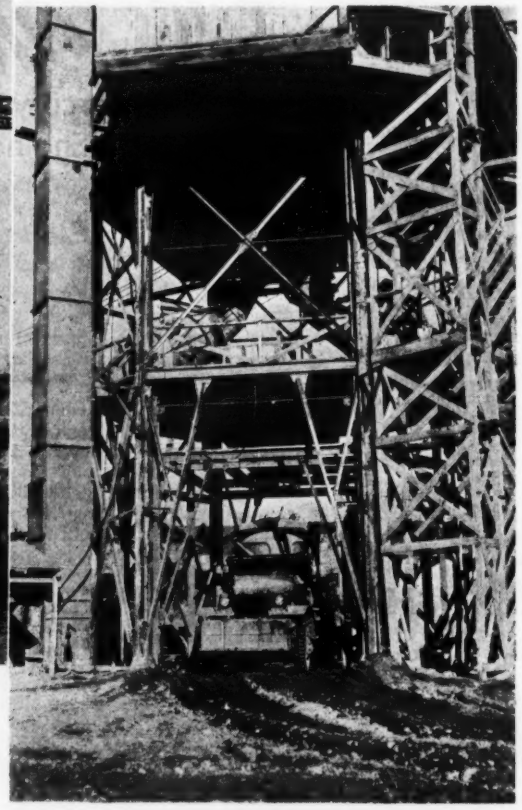
Galion, Ohio





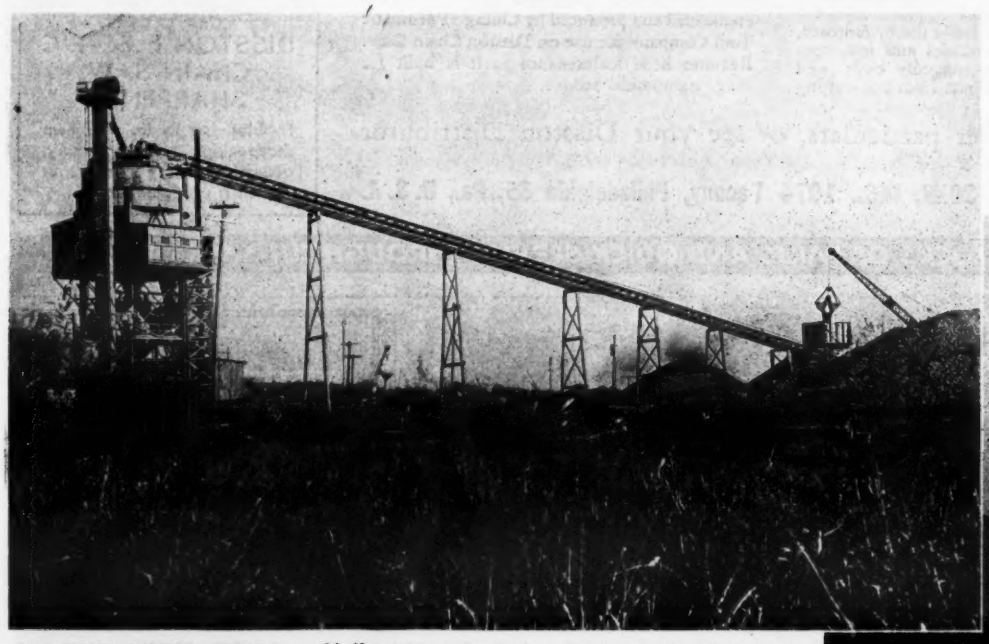
LOWER GUIDE WALL. The downstream guide wall shown here during concrete placing is 504 feet long, 18 feet wide at the bottom, 5 feet wide at the top, and 36 feet high. Material on its river edge was dredged away, and the former access road along the edge of the river was replaced by a new road.

New Miss

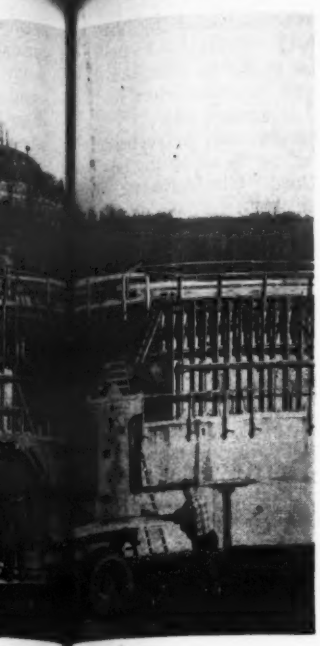


BATCH PLANT. The total amount of concrete placed in both guide walls was about 17,915 cubic yards. This Blaw-Knox batching plant and two 2-yard Koehring mixers on the site were more than adequate to meet demands. Trucks pulled under the plant carrying two 2-yard concrete buckets.

NEW LOCK. A gasoline barge and pusher go through Lock [illegible]. On the landward side, another lock 110 x 600 f[illegible] barge tows. The Corps of Engineers, St. Paul District, resumed th[illegible] Construction Co. of Winona, Minn. Work on them started in April, [illegible], of Col. W. K. Wilson, Jr., St. Paul District Engineer, and [illegible]



AGGREGATE YARD. At the aggregate yard, a Koehring clamshell filled wooden hoppers over two Barber-Greene conveyors which delivered aggregate to the bins. Gates under the hoppers were opened in accordance with requirements to keep the plant bins filled.



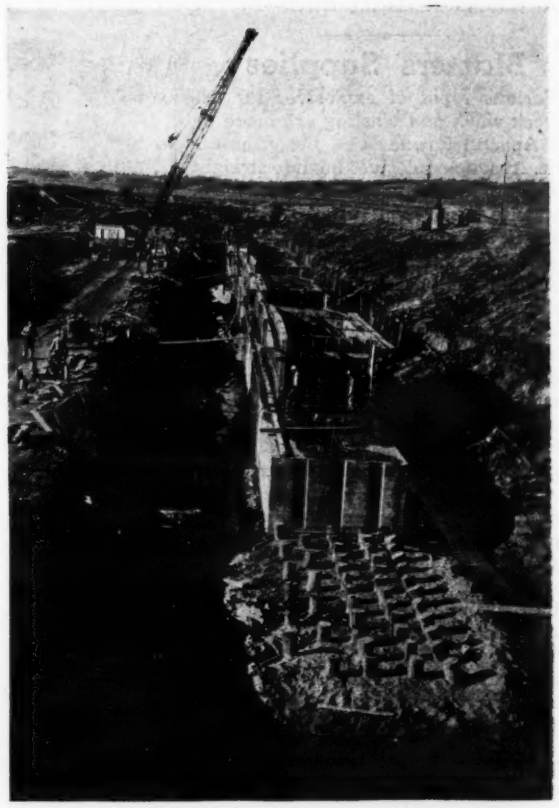
CONCRETING. At left, a Koehring crane pours the top tier of the downstream guide wall. Two trucks carrying two 2-yard concrete buckets each on a short haul from the batching and mixing plant kept the paving crew busy. The concrete was vibrated for thorough distribution in the forms.

RIVER SIDE From the river side of the downstream guide wall we see the partially completed lock at right center background, the existing lock and dam farther right. Two contracts—one for a central control station (Geo. J. Grant Construction Co. of Minneapolis), one for gates and machinery (Standard Construction Co. of Minneapolis)—were scheduled for completion in September and November of 1947, respectively. Another allowing 600 days was awarded last June for building and installing the power, control, and lighting system.

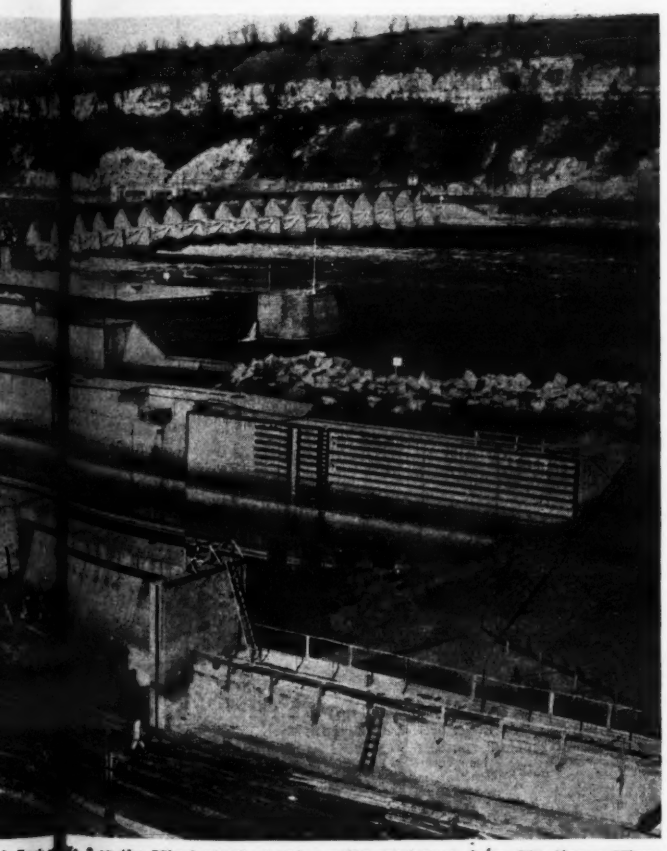
...issippi River Lock

Corps of Engineers' Project Will Permit Increase in Traffic, Longer Barge Tows; Concrete Structure Is 110 x 600 Feet

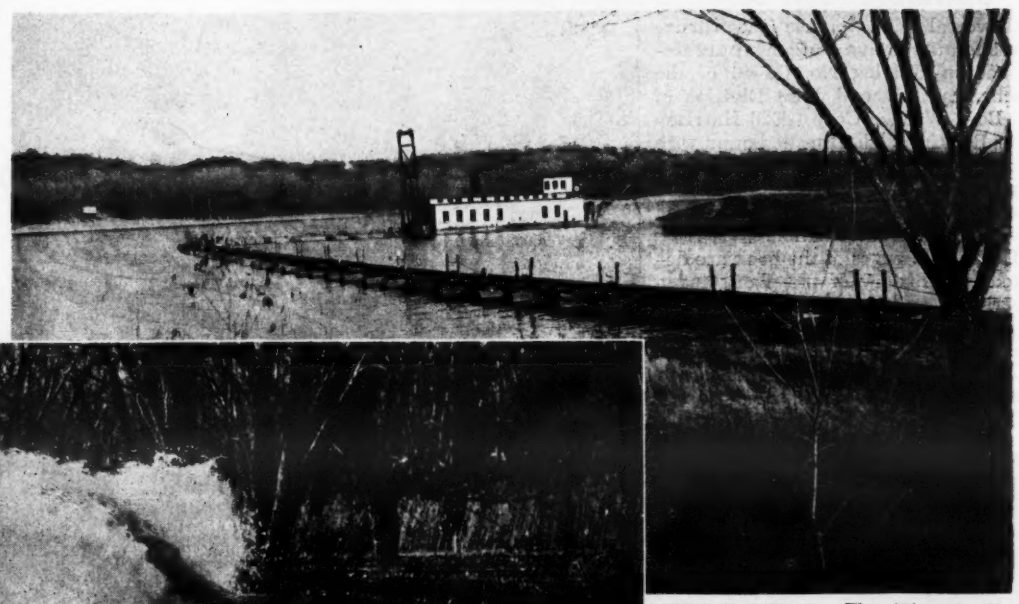
(Blaine S. Britton Photos)



UPPER GUIDE WALL. Various stages of construction are shown here on the upstream guide wall, 920 feet long, 14 feet wide at the bottom, 5 feet wide at the top, 29 feet high. The first tier of concrete has been poured and forms are ready for the second. Foundation piling on the river side was driven on a batter.



...o. 2 on the Mississippi about a mile upstream from Hastings, Minn., ...as recently constructed to accommodate increased traffic and longer ...alted by the war, and let a contract for the two guide walls to United ...was completed in July, 1947. The entire project is under the supervision ...enson, Chief, Operations Division, St. Paul District Office.



DREDGING. The Minneapolis Dredging Co.'s dredge Bernie Harris is shown above on the downstream side of the new lock, about to cut the old access road.

PIPE LINE. At left is the discharge end of the pipe line through which passed some 1,610,000 yards. Upstream approach dredging accounted for 310,000 yards, downstream for the rest.

Safe-T-Stikrs remind a worker about to start an operation to do it safely.

Stickers Aid Safety

Safety stickers are now available to warn workmen — like a conscience — when they are about to start an operation in a manner which is not safe. Made by the Howard Co., 1227 20th Place, Hermosa Beach, Calif., these Safe-T-Stikrs are colored and worded like miniature billboards.

Self-sticking, they are designed to be placed where they immediately catch the worker's eye. They can also be peeled off and replaced with new fresh reminders. Size of the stickers is 2 x 4 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 33.

Blasters' Supplies

Various types of explosives for use in rock work and blasting are made by the Apache Powder Co., Inc., Benson, Ariz. Apache explosives include straight dynamite, standard dynamite, special dynamite, gelatin, special gelatin, Amogel, permissible dynamite, and quarry dynamite.

A 40-page pocket-size booklet describes these various types, giving their characteristics and the recommendations for their uses. A considerable portion of the booklet is given over to a discussion of the properties of high explosives and general information on their proper and safe transportation, storage, and use. Although Apache Powder Co. does not manufacture blasting accessories and detonators, it supplies them, and the booklet also contains complete information on the fuses, blasting caps, detonators, blasting machines, crimpers, blasting mats, etc., which are available.

Apache explosives are distributed in the Southwest. Interested contractors and engineers in that area may secure a copy of the booklet from the company by writing on their organization or official letterhead.

Universal Joint Data

Universal joints for use in construction and automotive equipment are described in Catalog No. G1-46 of the Mechanics Universal Joint Division of the Borg-Warner Corp., 2026 Harrison Ave., Rockford, Ill. Plastic bound with hard covers, this 74-page catalog contains complete descriptions of all the units in the line, their applications, and other pertinent information.

The first 10 pages of the book are devoted to a history of the plant, and a description of the shop processes and tests conducted in the production of these roller-bearing universal joints. The remaining sections are concerned with the Type RA joints for wide-angle operation on industrial machines, with rollers and propeller shafts; Type C joints for industrial applications; Type R, aircraft; and Type C, R, automotive joints.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 53.

New-Size Truck Tires

The production of two new sizes of truck tires is announced by The B. F. Goodrich Co., Akron, Ohio. They are the 7.50-20 ten-ply Universal, and the 14.00-24 twenty-ply Rock Quarry casing. The Rock-Quarry casing has a smooth tread, recommended by the manufacturer for off-the-road use where cutting is a problem. The Universal can be used by contractors for small trucks and in gravel pits.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 92.

TWO GOOD POINTS

about Thor "Extra Wallop"

only Thor MOIL POINTS

...CAN TAKE IT
...CAN DELIVER IT

More than simply the best hardened steel, each Thor moil point is *precision-finished* as carefully as the *accurately-machined* parts of the breaker. Shank length is finished to close tolerances to meet the tappet perfectly. Flat-finished striking surface maintains alignment...and prevents irregular wear of working parts. Results? Every blow strikes at maximum efficiency. Even with the full power of a Thor Breaker's "extra wallop", point and breaker wear longer. See your THOR dealer.

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Exclusive features, expert design and superior construction characterize Owen buckets. Long life with dependable service has resulted wherever Owens have been put to work.

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Name _____

Firm _____

Position _____

Sewer Pipe Poured, Floated to Position

(*Continued from page* 34)

except for a 36-inch opening at the top of the pipe.

The steel reinforcement of each pipe consists of two rings of round 1-inch bars, placed longitudinally at 6-inch centers, and two circular bars of ¾-inch round placed on 12-inch centers. The steel framework for each section is tied in place in advance of setting the steel forms. An American Revolver shipyard crane, mounted on a gantry frame, helps to move steel and set up the form work.

One of the most unusual and severe applications of modern construction equipment has been worked out in connection with the external vibration of concrete through the massive steel forms. External vibration with internal-type electric vibrators was first tried in the manufacture of much smaller concrete pipe for the San Diego Aqueduct (see C. & E. M., April, 1947, page 37) and proved feasible.

Steel clamps were welded to the concrete forms at intervals of about 5 feet, with a hole to take the stinger end of the vibrator. When a vibrator is inserted in one of these clamps, a plate is tightened down securely by means of two nuts, and the vibrator is held securely in place. Some 36 Viber electric vibrators were purchased for the job, and four more are contemplated to reduce labor costs in moving the vibrators from clamp to clamp.

Concrete men said these internal-type vibrators would burn themselves up when fastened down tight on the forms. But Dave Root and Charley Thompson, Pipe-Building Superintendent, had an idea it wasn't impossible. And they found in the Viber Co.'s General Manager a man who was willing to back his faith in his vibrators.

Watching the location of concrete all through the pour, and turning on the vibrators only in that immediate area for 10-second intervals, has meant that the vibrators have done an excellent job with a minimum of mechanical attention. When the Viber stingers are turned on, the big steel forms jump with life, according to Charley Thompson, and the fines of the mix come out to coat the forms perfectly smooth. While it is believed that this method is also effectively eliminating segregation of large rock particles, no cores have thus far been cut.

Pouring Methods

The steel forms had been made initially with a section of the bottom left open, but 4½-inch-slump concrete proved too fluid to make this design very usable. The bottom of each form was covered, with small trapdoors installed through which to inspect the concrete and let water bleed out of the mix. After the first two pours, during which the concrete crews were new at this type of work, a system was developed which is now working like magic.

The system goes like this: concrete from a Ransome 34-E dual-drum paver is dumped to Gar-Bro buckets, hoisted by the American crane to the top of the pipe form, and pouring begins at the heavy lug end of the bell. Bucket after bucket is dumped here in this one spot, with vibrators working at short intervals, until the concrete builds up to the top of the form.

C. & E. M. Photo

This shot shows pile dolphins with concrete caps (extreme left), I-beam skids to carry the pipe sections for launching, and the special tanks built to help float the 460-ton pipe sections on their 25-mile ocean journey to the Hyperion outfall job.

At that stage the natural slope of the concrete goes down with the toe of slope about one-third the pipe distance. Vibrators all along this toe do their duty as the pour then proceeds towards the far end of the pipe. Dumping the concrete in at the top causes the contents of each bucket to split up naturally, about one-half going on each side of the pipe.

This method is proving far superior to that based on the old theory that only one side of a pipe should be loaded, so the concrete can work down under the spring lines. Thompson's practical method keeps the concrete working continuously along the toe, and pipes recently poured strip out very well. There have been no rock pockets to patch since they started loading the lug end first.

A 9-sack batch is being mixed, with

(*Concluded on next page, col.* 3)

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HEADQUARTERS for REPAIRS—any make
We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.
Write for new Catalog CE-310 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.
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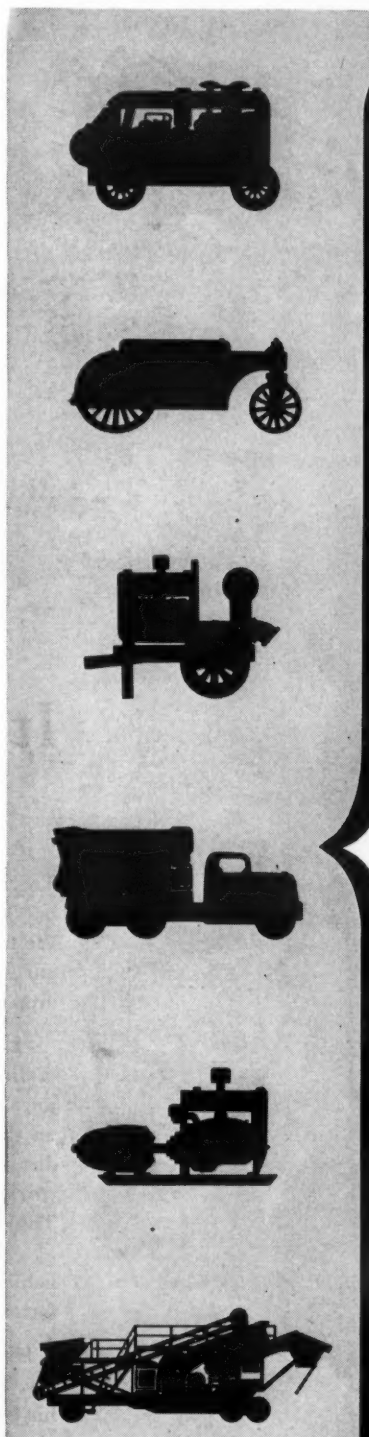
For all types of Contractors' and Industrial Power Machinery

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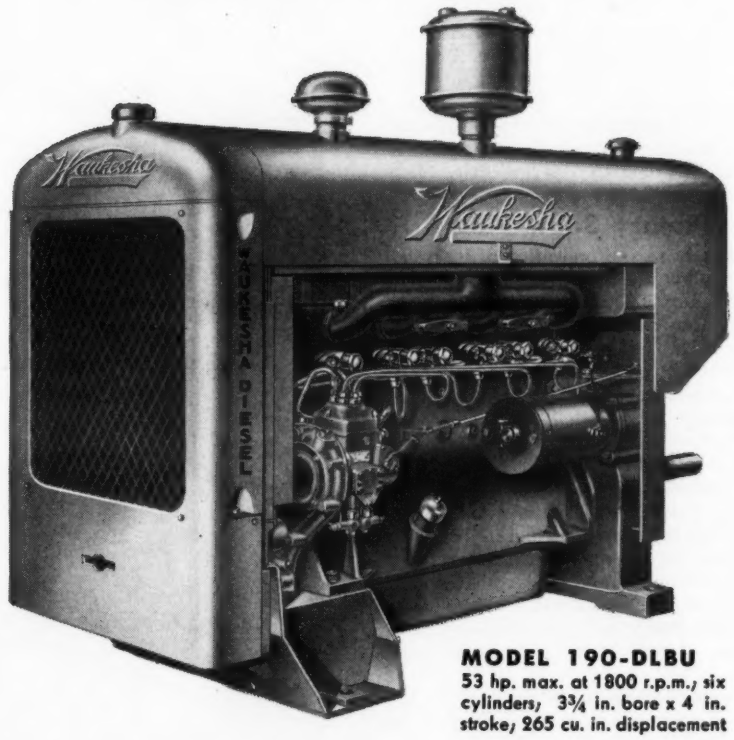
190-DLBU *Diesel*
POWER UNIT



MODEL 190-DLBU
53 hp. max. at 1800 r.p.m., six cylinders, 3¾ in. bore x 4 in. stroke, 265 cu. in. displacement

- Counterbalanced Crankshaft with hardened journals.
- Hardened Wet Sleeve Cylinder Liners.
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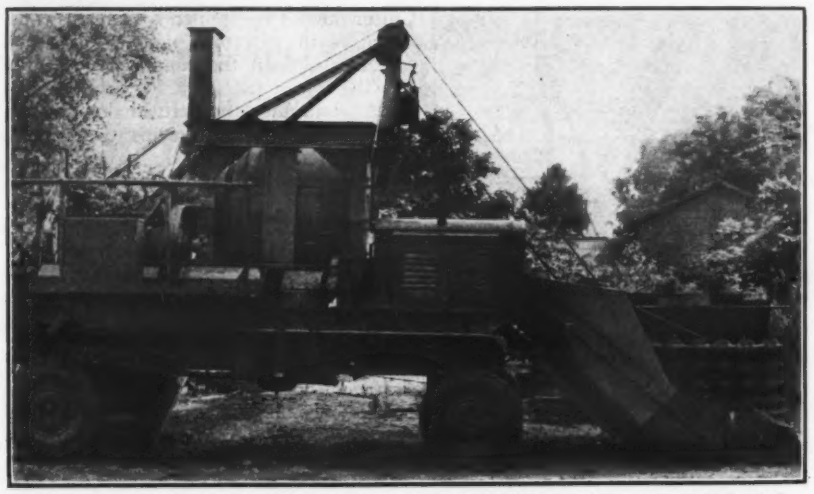

This view of the Ford Industries' portable asphalt plant shows the power unit, heated-asphalt pump, and controls for one-man operation of the entire plant.

Mobile Asphalt Plant Of 40-50 Tons Hourly

A pneumatic-tired asphalt plant has been announced by Ford Industries, Inc., 197 W. Dunedin Road, Columbus 2, Ohio. One-man operated, it is said to have an hourly production of from 40 to 50 tons of material of any required density. It can be transported by trailer or pulled by truck or tractor without the need for a special permit.

A heating drum is provided to raise the temperature of the aggregate to that of the bituminous material prior to mixing in the pugmill. This is said to produce a workable mix in any weather or temperature. Proportioning of the mix is accomplished prior to entering the drum-heated rectifier. The gate for the twin pugmill is air-controlled.

Skip feeder and belt conveyor are optional equipment. An auxiliary drier drum is also available.

Production at present consists of the Model No. 1500 one-drum unit. This will be superseded by the Models No. 1000 and 2000 multidrum units. Production rights have been let to the Foote Co., Nunda, N. Y.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 17.

Rotary Snow Plow

Six features of operation of its rotary snow plow are the subject of a bulletin released by The Rotary Snow Plow Co., 1611 Central Ave., Minneapolis 13, Minn. This plow is designed to throw snow over and off the road. The six features discussed are speed, action, hydraulic control, balance, power, and protection for the cabin.

The bulletin lists the specifications and performance ability of the Snow King, and then goes into detail in explaining its component parts. The items covered are the moldboard, rotors, plow transmission, chutes, slicer blades, auxiliary engine, cabin enclosure, removability, hitch and control, universal joints, drive shaft, and transmission case.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 64.

Wayne Crane Appointment

Felix W. Sweeney has been appointed Assistant Sales Manager of the Wayne Crane Division of the American Steel Dredge Co., Inc., Fort Wayne, Ind. Mr. Sweeney will conduct sales clinics in the western territories.

Vulcan Tools

A complete line for every type of Rock Drill, Pavement Breaker and Clay Digger.

Vulcan Tool Manufacturing Co.
35-43 Liberty Street, Quincy, Mass.
Branch Offices and Warehouse Stocks:
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Sewer Pipe Poured, Floated to Position

(Continued from preceding page)

rock and sand coming by truck from Graham Brothers Long Beach rock plant. Sack cement is trucked in and stored in a 3,000-sack shed, then added at the mixer. The mix design for this important and difficult concrete is as follows:

Rock, ¾-inch maximum	2,160 lbs.
Pea gravel	627 lbs.
Sand	1,720 lbs.
Cement	9 sacks
Water	48.6 gals.

Each pipe section has a volume of approximately 220 cubic yards, and takes about 5 hours to pour. It is expected that the job will be geared to see one section in place every week. As the concrete pipes are poured, various haul-down hairpins and angle-iron protections for the lug base are embedded.

Pouring operations are moving along rapidly enough to give four batch trucks, each hauling five 1⅜-cubic-yard batches, pretty steady employment.

Personnel

The Long Beach pouring operation is also being directed under the supervision of Col. H. G. Smith, under Lloyd Aldrich. Charley Thompson is Atkinson's Superintendent at the Long Beach pipe-pouring yard.

Cataphote Adds Salesman; Opens Southern Territory

The addition of James F. Roose to its sales organization has been announced by the Cement Products Division of Cataphote Corp., Toledo, Ohio. Mr. Roose will handle sales and marketing of Darex AEA, air-entraining agent.

At the same time, Cataphote announces an expansion in the territory it covers. It will now distribute Darex in Tennessee, Alabama, Mississippi, and Florida, in addition to Ohio, Indiana, Michigan, and Kentucky.

"THE SIGN OF EXTRA SERVICE"

It sure gave us a lift!

There's more than one way to load out trucks, but I never saw one that could beat this. We thought we used to do pretty well until our Oliver "Cletrac" dealer happened to drop in one day.

"Look," he said, "you're doing a good job of dirt moving, but here's a way to give the job a real lift. Put a new Drott Hi-Lift shovel on those Cletrac's of yours and watch the dirt fly. You see, this unit strips, scoops, carries, and dumps the dirt into your trucks. The deep shovel gets a full load every time . . . doesn't spill. It's pivoted so you can't help but get a bigger load and that means faster, more economical operation.

His suggestion gave our production a real lift. The Oliver "Cletrac" dealer sure knows his business and is a big help in ours.

Cletrac
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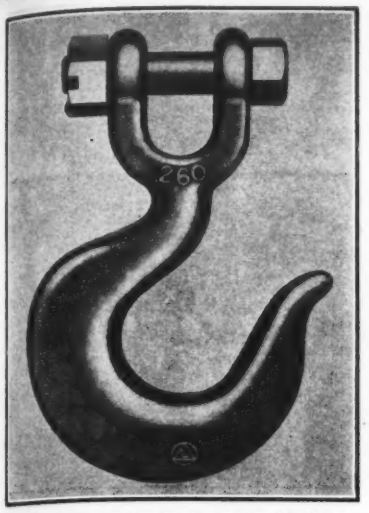


This new clevis hook, made in four sizes, has been added to the line of Laughlin wire-rope fittings.

Forged Clevis Hook

A clevis hook said to have unusual speed of attachment has been developed by the Thomas Laughlin Co., 133 Fore St., Portland 6, Maine. The Laughlin clevis hook utilizes a bolt, slotted nut, and cotter pin for fastening. The hook is transferred and attached without the use of any special tools.

This hook, supplied with either the Laughlin safety latch or reversed jaw, is made in four sizes; 1½, 2, 3, and 5 tons. All parts, including the bolts, are of drop-forged heat-treated steel.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 6.

Level or Angle Gage

A level and angle indicator for use by contractors and engineers has been put on the market by the R-D Co., P. O. Box 912, Flint, Mich. In addition to indicating levels, the Anglevel will determine angles, slopes, pitches, and inclines. Numbers on the dial facilitate finding the relation of angular surfaces to horizontal and vertical surfaces.

The unit is provided with two horizontal and two vertical vials which, when placed in retainers, give instant readings. The retainer can be inserted, adjusted, and positively locked into position in 3 minutes or less, it is stated. The dial is of clear unbreakable plastic and is calibrated in degrees from 0 to 360. The frame is made of heat-treated aluminum. The Anglevel is 16 inches long, 3 inches wide, ¾ inch thick, and weighs 1½ pounds.

The manufacturer reports its use for such varied tasks as ascertaining angles, etc., on bridge struts and bracing, in building forms, for determining belt and pulley angles, in structural steel work, setting machinery, and similar jobs where level, angles, slopes, or inclines must be determined quickly and accurately.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 11.

Mats for Curing Concrete

An announcement telling about its line of cotton quilts for curing concrete has been prepared by the Universal Highway Materials Corp., 41 Locust St., Yonkers 2, N.Y. Maker of the Kurekoat brand of cotton quilts, this organization recently succeeded the Highway Materials & Equipment Dept. of the Universal Marine Supply Corp.; it is an affiliate of that corporation.

The announcement gives the claims advanced for the use of cotton mats in curing concrete. It includes an extract from the Portland Cement Association's "Concrete Pavement Manual" on the use of this method. It also gives the authorization under which the U. S. Department of Agriculture began its program of experimentation with cotton quilts for curing concrete in highway construction.

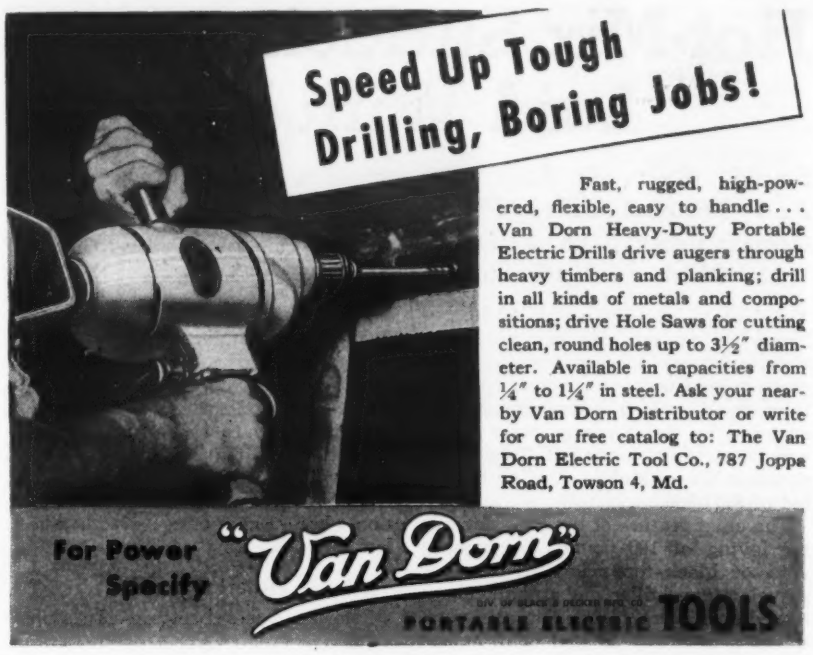
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 72.

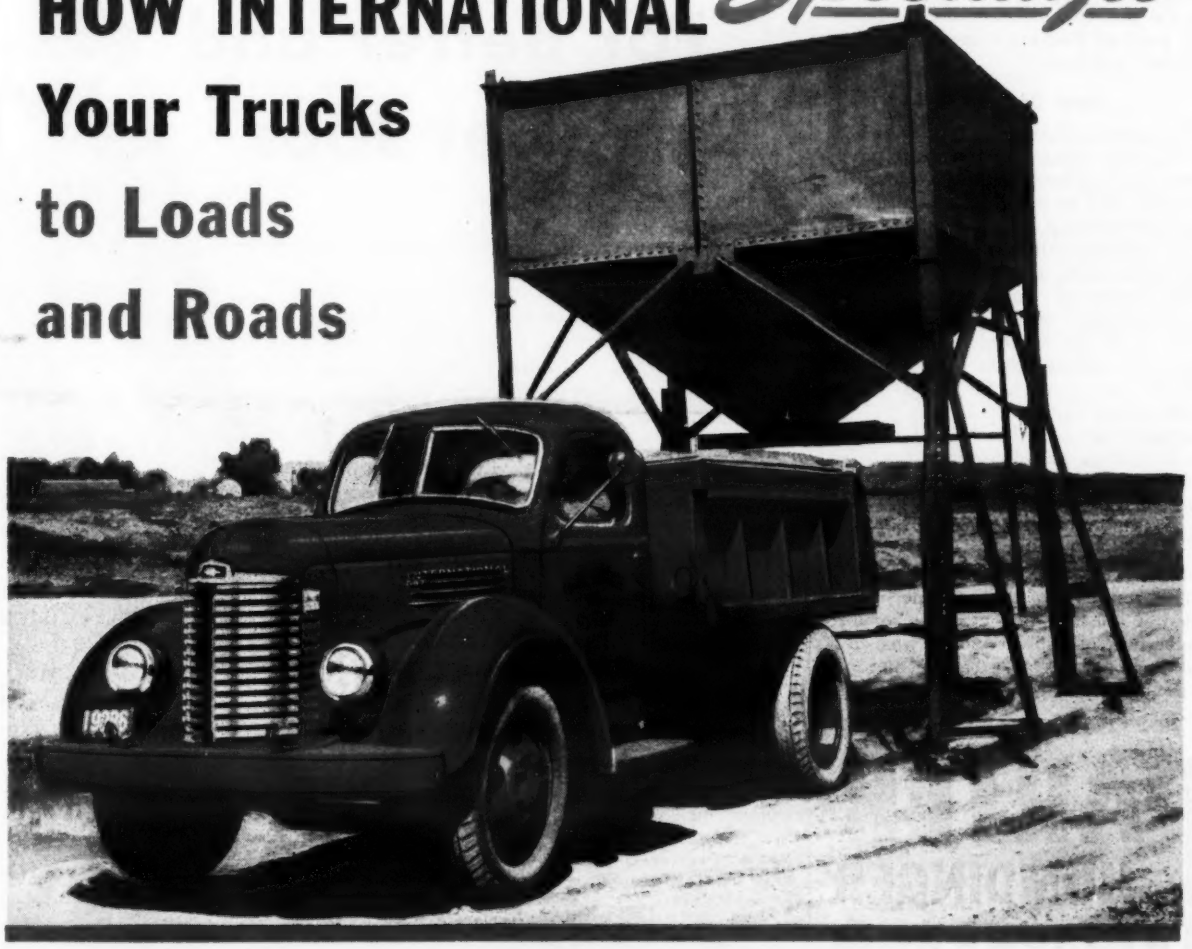
Spreader Replaces Dump-Truck End Gate

A new spreader for use with a dump truck has been announced by The Flink Co., Dept. 674, Streator, Ill. The Model WS-1 spreader attaches to the truck in the same manner as the tail-gate. It is designed to spread sand, chlorides, or lime.

Two spinner disks operate from the corners of the spreader, spaced about 6 feet apart, and are said to yield a uniform throw of materials up to 24 feet in width. According to the manufacturer, the WS-1 will handle either wet or dry materials without bridging.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 10.


Speed Up Tough Drilling, Boring Jobs!
Fast, rugged, high-powered, flexible, easy to handle . . . Van Dorn Heavy-Duty Portable Electric Drills drive augers through heavy timbers and planking; drill in all kinds of metals and compositions; drive Hole Saws for cutting clean, round holes up to 3½" diameter. Available in capacities from ¼" to 1¼" in steel. Ask your nearby Van Dorn Distributor or write for our free catalog to: The Van Dorn Electric Tool Co., 787 Joppa Road, Towson 4, Md.
For Power Specify "Van Dorn"
PORTABLE ELECTRIC TOOLS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This first step is an analysis of your hauling problem by your International Dealer or Branch.
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INTERNATIONAL Trucks

Hot-Mix Surfacing Laid With Finisher

Sand, Gravel, Asphalt, And Mineral Filler Mixed Continuously to Furnish 19 Miles of Black-Top

✦ A 19.2-MILE stretch of U. S. 80, between Selma and Browns in Dallas County in central Alabama, has been given a new wearing surface. A contract for the long improvement was awarded by the Alabama State Highway Department to the F. L. Bray Construction Co. of Mobile, Ala., on its low bid of $171,980.

The chief feature of the contract was the laying of 100 pounds per square yard of black-top made up of sand, gravel, mineral filler, and asphalt. These ingredients were blended in the contractor's centrally located continuous-mixing plant, hauled to the road, and laid with a mechanical finishing machine. The job started in October, 1946, and was completed in June, 1947. Almost all operations were stopped during the last half of December, January, and part of February because of bad and wet weather.

New Base Laid

The new surface is 20 feet wide, the same as the original bituminous pavement. But in several long sections the old road was in such bad shape that it had to be torn up. It was replaced with an 8-inch sand-clay-gravel base course with 10 to 15 per cent clay content.

This material was first thoroughly mixed in place by motor graders, then rolled both by sheepsfoot and pneumatic-tire rollers. Next, the compacted surface was given a tar prime of 0.3 gallon to the square yard. The tar was purchased from Reilly Tar & Chemical Co. of Mobile and delivered to Marion Junction by tank car; there it was stored in the contractor's portable tank for later use. The prime was followed by a double bituminous treatment 22 feet wide.

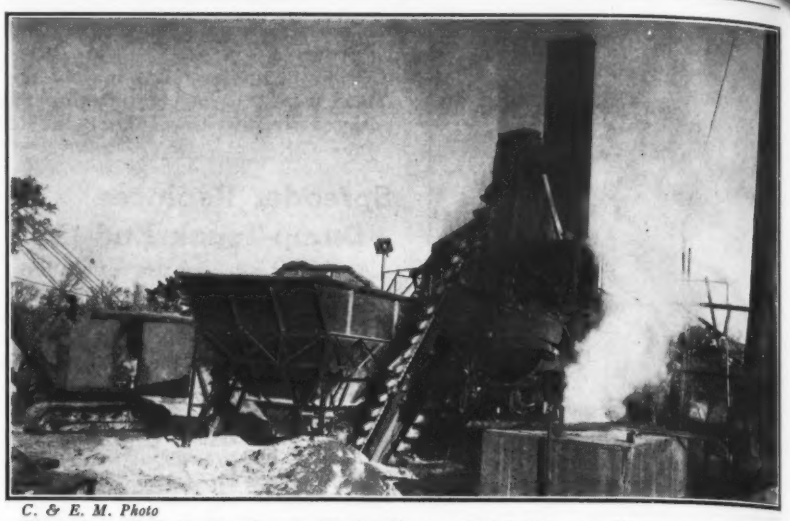
The first part of this treatment consisted of a 0.43-gallon-per-square-yard application of asphalt which was covered by coarse slag. The second asphalt application of 0.38 gallon was topped by fine slag. Both coarse and fine aggregate were distributed by spreader boxes hooked to the rear of trucks. This treatment was covered with 80 pounds of plant-mix per square yard.

About 5 miles of new base and surfacing was completed in this manner, the work being done in the spring months. The laying of the plant-mix started during February on that portion which was to receive 100 pounds per square yard of resurfacing material. Meanwhile the double bituminous treatment was performed on that portion where a new base course had been laid.

Material Sources

The contractor set up his asphalt plant just to the north of U. S. 80, midway of the project, and about 3 miles east of Marion Junction where the east-west and north-south lines of the Southern Railway intersect. The plant

(*Continued on next page*)



C. & E. M. Photo
This view of F. L. Bray's new Barber-Greene Model 842 asphalt plant shows the 30-ton receiving hopper, the 20-foot-high cold elevator, and the 30 x 3½-foot drier.

CARTER HUMDINGER DIAPHRAGM PUMPS

Rugged! Yes, it's rugged all right. Countless testimonials make us proud in the knowledge that here is a pump that's tough enough to stand up under the harshest treatment! Designed to be able to "take a beating" CARTER offers for your most exacting demands a complete line of Humdinger diaphragm pumps. See for yourself!

Write for Bulletin 4503

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For Better and Faster Jobs

Speed up your work schedules—do a better job at less cost—with Barco Portable Gasoline Hammers. Each of these powerful, self-contained tools multiplies the work of one man, saves money every hour it's on the job. In hard-to-reach spots and in rough terrain, Barco hits hard and fast. Eleven special attachments—all instantly interchangeable. Write for complete information.

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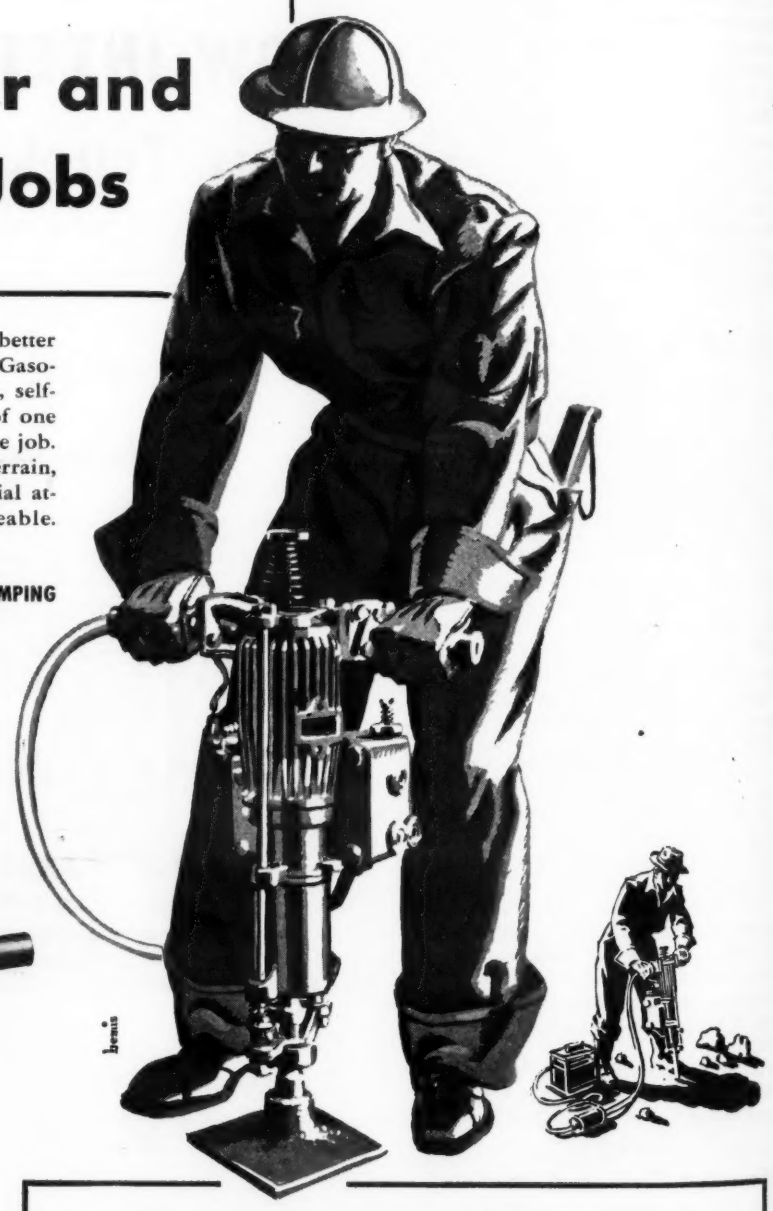

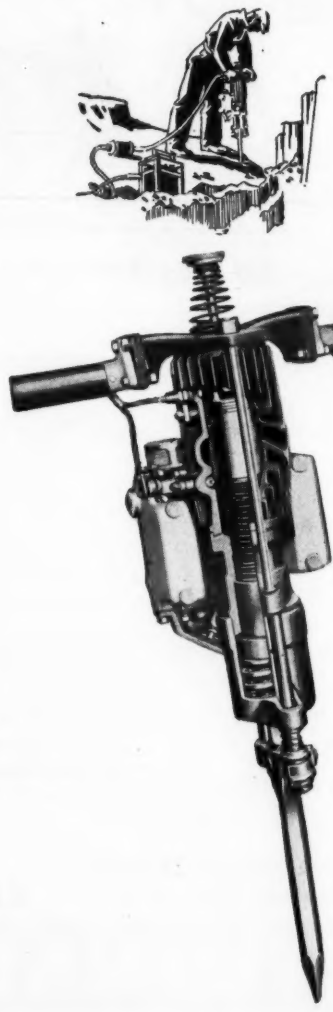

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was slightly west of the Cahaba River, which flows south, crossing under the highway at this point. It was also located alongside a large sand and gravel pit which furnished most of the aggregate for the mix. This local pit source was too inclined to yield oversize material for the coarse aggregate; consequently it had to be supplemented with outside commercial-source gravel to obtain the required gradation.

Pea gravel was obtained from the Crosby Sand & Gravel Co. at Selma. The supplier delivered the material by truck to the plant site, a haul distance of 11 miles. A coarser grade of aggregate, known as 6B gravel, was purchased from the Southeastern Sand & Gravel Co. at Plantersville, Ala., northeast of Selma, and shipped 25 miles over the Southern Railway to Marion Junction. There it was unloaded from the gondola cars by a crane and hauled 3 miles to the plant.

Both of the purchased grades of washed gravel were stockpiled, as was also the material that was taken from the local pit bordering the plant. To reach this aggregate, a 2-foot layer of clay overburden was first removed, and then the sand and gravel was excavated to a depth of 10 feet. Digging was done by a Northwest crane with a 35-foot boom and a ¾-yard clamshell or dragline bucket to suit conditions. A Mississippi Wagon hauled the pit-run material and stockpiled it near the other two piles of processed gravel.

Mineral filler for the mix was obtained from the National Cement Co. of Birmingham, Ala., which shipped it in 94-pound bags to the Southern Railway siding at Marion Junction. From there the limestone dust was hauled to the plant in trucks.

The remaining ingredient of the mix, asphalt, was supplied from the Baton Rouge, La., refinery of the Standard Oil Co. of New Jersey. It was shipped in tank cars to Marion Junction where it was heated by a 25-hp oil-burning boiler. Then an Etnyre 1,100-gallon distributor pumped the asphalt from the cars and hauled it to the plant. Both AC-8 and AC-12 asphalt were used. But the major part of the job was done with the latter grade, penetration 120-150, as it performed better in the colder weather.

The gradation requirements of the two sizes of purchased gravel and the limestone dust were as follows:

Sieve Size	Per Cent Passing		
	6B Gravel	Pea Gravel	Mineral Filler
¼-inch	100	...	...
½-inch	90–100	100	...
⅜-inch	40–80	90–100	...
No. 4	0–25	60–85	...
No. 10	0–6	10–20	...
No. 80	...	...	100
No. 200	...	...	85–88

A typical distribution of the materials in the mix was proportioned as follows:

Material	Per Cent
Local pit-run sand and gravel	61.7
Washed gravel—6B and pea	30.8
Mineral filler	2.0
Asphalt	5.5
	100.0

Asphalt Plant

A new Barber-Greene Model 842 continuous-mix all-electric asphalt plant was purchased through Construction Equipment Co., Birmingham, Ala. It was set up adjoining the big sand and gravel pit, with its 30-ton receiving hopper close to the three stockpiles of aggregate. The same crane that worked the pit also fed the hopper with a clamshell bucket. The usual procedure for the crane was to take six bucketfuls of pit-run gravel from the stockpile, followed by two each of the 6B and pea gravel.

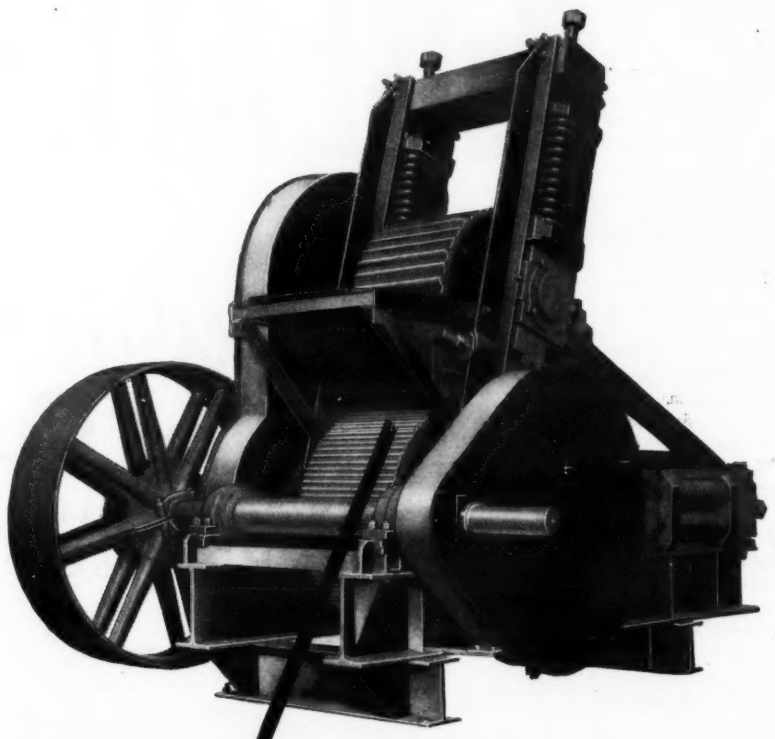
A feeder at the bottom of the hopper regulated the flow of material to the 20-foot-high cold bucket elevator which lifted the aggregate to the drier. The drier is 30 feet long x 3½ feet in diameter; it has a Hauck burner at the low or exit end, and a 30-foot chimney at the high or entrance end for discharging smoke and fumes.

The heated aggregate dropped from the drier into the bottom of the enclosed hot elevator. It was then lifted 50 feet to a double-deck 6 x 4-foot vibrating screen having ⅞-inch square openings on the top deck and a No. 8 sieve size below. Underneath the screens was a 4-compartment 30-ton-capacity bin in which the aggregate was collected. All the material that did not pass the ⅞-inch screen was discharged over the side of the tower to the ground. That which passed the ⅞-inch screen, but was retained on the No. 8, was

(Continued on next page)

C. & E. M. Photo

This Barber-Greene Finisher pushes along a truck load of plant-mix on a 19.2-mile job on U. S. 80 in central Alabama.



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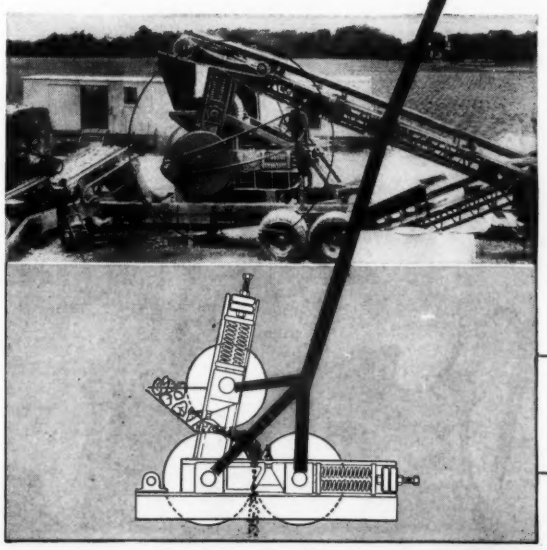

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Hot-Mix Surfacing Laid With Finisher

(Continued from preceding page)

chuted into No. 3 and 4 bins. The fine material passing the No. 8 screen dropped into the No. 1 and 2 bins.

At the bottom of each bin was a hopper with an adjustable gate controlling the rate of discharge of material from that bin. A belt picked up the predetermined amount of aggregate and moved it along to a 35-foot enclosed elevator leading up to the mixer box. Alongside this elevator was a hopper into which the bags of mineral filler were dumped. From the hopper the limestone dust was moved along in the correct proportion by a worm gear to the bottom of the mixer elevator. All the aggregate was then raised together to the pugmill where the material was mixed with the asphalt.

The asphalt was stored in a 11,000-gallon tank which was heated by a 65-hp locomotive-type oil-burning boiler which develops 150-pound pressure. An asphalt pump, part of the plant equipment, drew the asphalt from the tank through a 3-inch steam-jacketed line which distributed it into three spray bars. These bars were about 6 inches above the aggregate as it entered the mixer. The rate of discharge of the asphalt was controlled so that each ton of hot-mix contained 107.3 pounds of bitumen. Sprockets on the material belt controlled the flow rate of the aggregate; thus no weighing was necessary at any point and the production of hot-mix was continuous.

Under a wooden lean-to were two International UD-18 6-cylinder diesel engines which operated the plant. Only one at a time was usually in operation; the other was held in reserve as a stand-by. The diesel drove a Westinghouse ac generator, 62.5 kva at 1,200 rpm on a 240-volt 150-amp 3-phase 60-cycle circuit. Four Westinghouse electric motors were run from this generator. A 40-hp unit operated the mixer and the elevator and worm gear feeding it. The other three motors, all 25 hp, drove respectively the feeder, cold elevator, and drier; the hot elevator and vibrating screens; and the aggregate gradation unit.

Fuel oil for the boilers and the burner on the drier was supplied to a 6,000-gallon storage tank at the plant by the Hempstead Oil Co. of Mobile, Ala. Delivery of the fuel oil was made by tank truck.

While the plant has a production capacity of 60 tons per hour, only about 45 tons was averaged because of the season of the year during which the work was carried on. The temperature had to be at least 40 degrees and rising before any plant-mix could be laid. Hence a full 8-hour day was seldom worked during the winter months. The average production was around 280 tons per day. When weather permitted and the contractor could work long hours, the plant delivered as high as 512 tons a day. It averaged about 450 tons during the latter part of the job when warm weather permitted work from 7 a.m. until 6 p.m.

C. & E. M. Photo
A Buffalo-Springfield 7-ton tandem rolls plant-mix on the P. L. Bray Construction Co. job between Selma and Browns, Alabama.

Laying the Hot-Mix

The hot-mix material left the plant at a temperature of 300 degrees F. It was discharged from the mixer over a short conveyor belt into a fleet of six GMC trucks holding 10 tons each. The contractor used only five dump trucks on the short 3 or 4-mile hauls. But on the longer 10-mile hauls, he used as many as nine. The extras were also used as storage for the plant on days when the laying crew had to spend extra time on bridge-deck joints. Otherwise, by the time the joint was made, all the trucks would have been at the finisher and the plant would have had to shut down and wait for them to return.

Before laying any mix, the distributor first applied a tack coat of RC-2 asphalt at the rate of 0.15 gallon per square yard for the full width of the road. The full-width application was used because the road was closed to all but local traffic, through traffic being directed over a long tortuous detour. Enough tack was run out to take care of one day's spreading of plant-mix. When the old sections of the road were very rough, a leveling course was laid first. This mix was slightly finer than the surface course, with 100 per cent of the material being required to pass the ½-inch screen.

On the haul with the mix, which averaged 5 miles, the contents of the trucks were covered with tarpaulins. This prevented any loss greater than 10 de-

(Concluded on next page)

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grees in temperature from the plant to the road. A single Barber-Greene Finisher laid the 100-pound course of hot-mix. A 10-foot lane was laid on one half of the road; then the Finisher was moved back to the starting point for that day and brought up the adjoining lane to complete the full 20-foot width. The material was compacted by a Buffalo-Springfield 7-ton tandem roller.

The plant-mix was laid 100 pounds per square yard over the portions of the existing road that were left undisturbed; it was laid 80 pounds per square yard over those sections where the new base course was constructed with the bituminous treatment on top. This was laid in 11-foot lanes. A sieve analysis of a typical sample of plant-mix surface course showed the following gradation of the aggregate:

Sieve Size	Per Cent Passing
¾-inch	100
⅜-inch	98
½-inch	93
⅛-inch	85
No. 4	62
No. 10	48
No. 20	40
No. 40	20
No. 80	5
No. 200	2

Quantities and Personnel

The major items included in the 19.2-mile contract were:

Gravel base course	45,400 cu. yds.
Surface treatment	92,500 sq. yds.
Leveling course, plant-mix	1,995 tons
Surface course, plant-mix	241,500 sq. yds.

The F. L. Bray Construction Co. employed an average force of 8 men at the asphalt plant, and 9 for the road operations. Frank Bray was General Superintendent on the project. C. L. Brown was in charge of the base work, and Forrest Gregg was in charge of the laying crew for the plant-mix.

The Alabama State Highway Department was represented by Ellis Kimbrough, Project Engineer, and W. S. Kirksey, Inspector. The Department is headed by Ward W. McFarland, Highway Director, while Marvin Taylor is Construction Engineer. This project was located in the Third Division, of which S. J. Cumming is Division Engineer with headquarters at Tuscaloosa.

Wire-Rope Terminals

The addition of a socket-type cable terminal to its line of wire-rope fittings has been announced by the Macwhyte Co., Kenosha, Wis. These terminals, formerly made by Paulsen & Nardon, Inc., of Los Angeles, will be marketed as the Macwhyte Socketype cable terminals.

The terminals consist of an alloy-steel cadmium-plated eye or fork-type fitting plus a stainless steel sleeve for swaging to a wire rope. They are available loose or attached to the rope in a complete cable assembly to specification length. It is claimed that these terminals allow the cable to swivel freely when load-free, thereby eliminating kinking. They are swaged to the cable by any standard rotary swaging machine or punch press equipment.

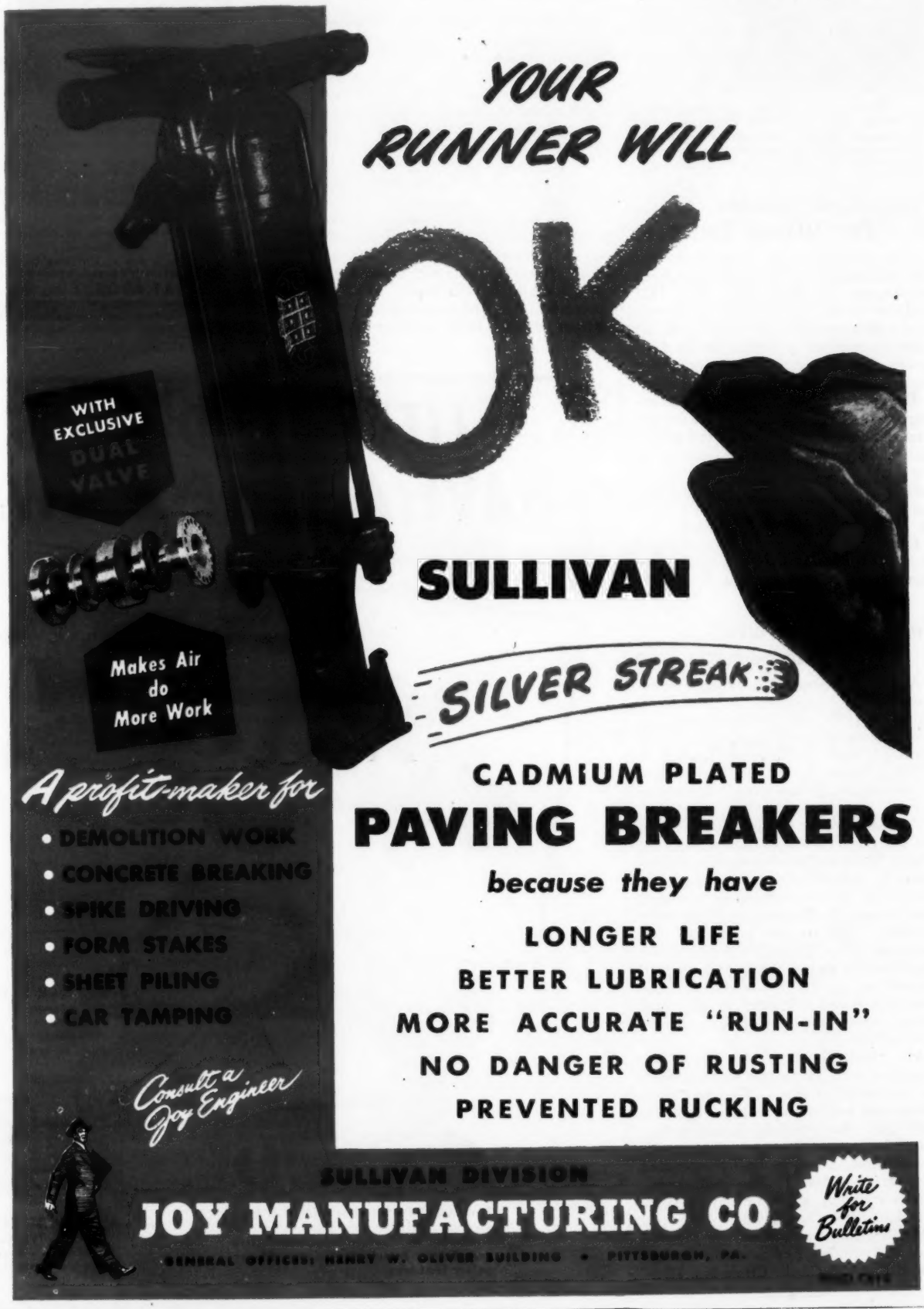
Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 23.

Light-Weight Power Plant

A broadside describing its Model No. 300 electric plant has been issued by the Winpower Mfg. Co., Newton, Iowa. This light-weight portable Powr-Pak unit is designed for powering lights and small electric tools.

The bulletin tells of eight specific applications for this unit, and gives the advantages obtained by its use. Specifications of performance are listed for the Models No. 300, 250, 350-C and 350-D. The first two units mentioned are for 110-v ac current; the 350-C is for 6-v dc, and the 350-D is for 12-v dc. Total weight for each unit is 70 pounds.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 54.



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for contractors, highway officials and distributors wanting further details on printed matter from the manufacturers advertising in these pages. Our Reader Service Department will be glad to forward any literature or special requests you mail to us at the above address.

Contractors & Engineers Monthly

All types of terracing, bulldozing and leveling may be handled with the new 90 Series Skyline Hydraulic Loaders, shown here in action with its dozer attachment mounted on a Ford tractor.

Front-End Loader For Wheel Tractors

A front-end loader attachment for use with rubber-tired tractors has been announced by Davis Mfg. Inc., 1521 McLean Blvd., Wichita, Kans. Known as the Skyline 90, it is designed to lift 1,000 pounds to a height of 10 feet. Easily changed attachments include a scoop-loader and a bulldozer.

The unit has its own oil system, reservoir, and hydraulic pump. Power for the pump is derived from either the power take-off or crankshaft, depending on the type of tractor used. According to the manufacturer, the only tool required for mounting the unit on a tractor is a pair of pliers or a wrench.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 26.

Telescopic Hoists For Dump-Truck Use

A line of telescopic hoists for use on dump trucks is made by the Cook Bros. Equipment Co., 1815 No. Broadway, Los Angeles 31, Calif. Capacities of these hydraulic units range from 6 to 30 tons. Power is obtained from a take-off connected to the truck's transmission.

Compactness is obtained by nesting the sleeves of the hoist one within the other. The number of sleeves is determined by individual requirements. Action of oil under pressure on a closed hoist forces the sleeves out of the main cylinder. The largest sleeve is first extended to its full length of travel before the next sleeve begins to come out. According to the manufacturer, the sleeves are not subjected to any load strains other than that of the pressure from within.

All Cook hoist drive lines are equipped with Mechanics needle-bearing universal joints. The gear-type pumps are said to be factory-tested to 1,500 psi. An overload pressure by-pass is incorporated as part of the pump. In addition, a mechanically operated by-pass is provided to keep undue pressure from being built up when the body is in its fully raised position.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 37.

Light-Weight Pipe

Fifty-four pages of information on pipe make up Catalog No. 44 of the Naylor Pipe Co., 1230 E. 92nd St., Chicago 19, Ill. Naylor pipe is available in sizes from 4 to 30 inches in diameter.

A feature of the catalog is a description of the Naylor Lockseam Spiralweld pipe. There is a history of its development, the story of how it is made, and the advantages claimed for this type of pipe construction.

The catalog contains many photographs of applications of Naylor pipe in construction and other fields. Also described are the fittings and flanges, the Naylor Wedge-Lock couplings, and the special fabrication service. The catalog lists test data, specifications, and the procedure for ordering. Also included is a card for registration for receiving further Naylor catalogs.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 61.

Highway Research Board Announces Annual Meeting

The 27th Annual Meeting of the Highway Research Board will be held December 2 to 5, 1947. Headquarters for the meeting will be the building of the National Academy of Sciences and National Research Council, 2101 Constitution Ave., Washington, D. C.

During the week of the meeting, the six departments of the Board will present and discuss important phases of highway technical development. These departments are: Economics, Finance, and Administration; Design; Materials and Construction; Maintenance; Traffic and Operations; and Soils. It is expected that many of the 65 project committees will also hold meetings.

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Draglines Rip Hard Clay On Irrigation-Canal Job

Terteling Finds New Way To Mechanize Structure Pours As 9-Mile Canal Is Added to Main System

+ MUCH of the hard work is over on the Tucumcari Irrigation Project in eastern New Mexico. Now the big job is to finish the 75-mile Conchas Canal and the system of laterals leading to 45,000 acres of irrigable lands high on the 4,000-foot mesa centering around the city of Tucumcari.

Under a $935,000 and a second $875,000 U. S. Bureau of Reclamation contract, the Boise, Idaho, contracting firm of J. A. Terteling & Sons., Inc., has been ripping 9 more miles of the main canal, digging about 75 miles of laterals, and pouring more than 1,000 miscellaneous drops, checks, drainage intakes, weirs, siphons, spillways, and Parshall flumes. The first contract, begun late last December, was finished in July, 1947. Additional work called for in the second contract was officially begun March 28 and should be pushed through to completion by the end of this month.

The story of how this work was done is a tale of excellent engineering and planning; of a contractor who had the intestinal fortitude to take a chance and bid as unclassified thousands of cubic yards of excavation leading through known rocky country. At the time this job was visited, the contractor apparently was winning on the chance. Although the digging was tough in many places, very little had stood up to the persistent gouging of dragline buckets.

Conchas History

The battle to bring water to the lands around Tucumcari dates back to 1938, when Congress authorized the Bureau of Reclamation to begin construction of the Tucumcari Project. Water from the Conchas Reservoir on the south side of the South Canadian River at the Conchas Dam — built by the U. S. Army Engineers — will be transported by the new Conchas Canal to the project lands in Quay County. From an average annual discharge of 194,000 acre-feet at the dam, Bureau of Reclamation engineers hope to make the dry but otherwise excellent lands bloom with alfalfa, clover, grain, vegetables, and short-staple cotton.

Actual construction beginning in 1940 has since pushed the 700-second-foot main canal about 60 miles from the dam. It has been a tremendous en-

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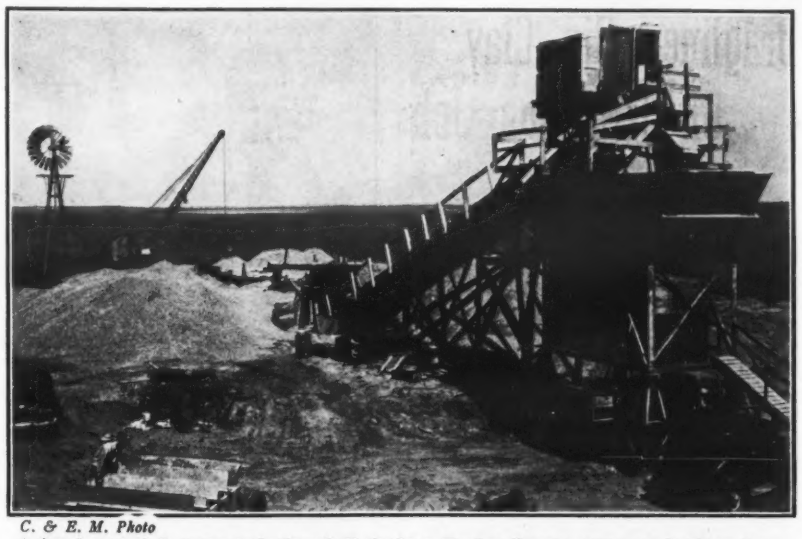

C. & E. M. Photo

A truck-mounted crane and clamshell feeds a Barber-Greene conveyor leading from aggregate-storage piles to the Johnson batching bins on the Terteling canal job.

Simplifies

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Attachment of tester is by means of interchangeable adapter which takes place of fuel injector. In addition to a "universal adapter" which serves more than 50 makes and types of Diesels, we have a complete line of special adapters for practically every commonly-used Diesel engine. Write for a copy of descriptive Leaflet 605.

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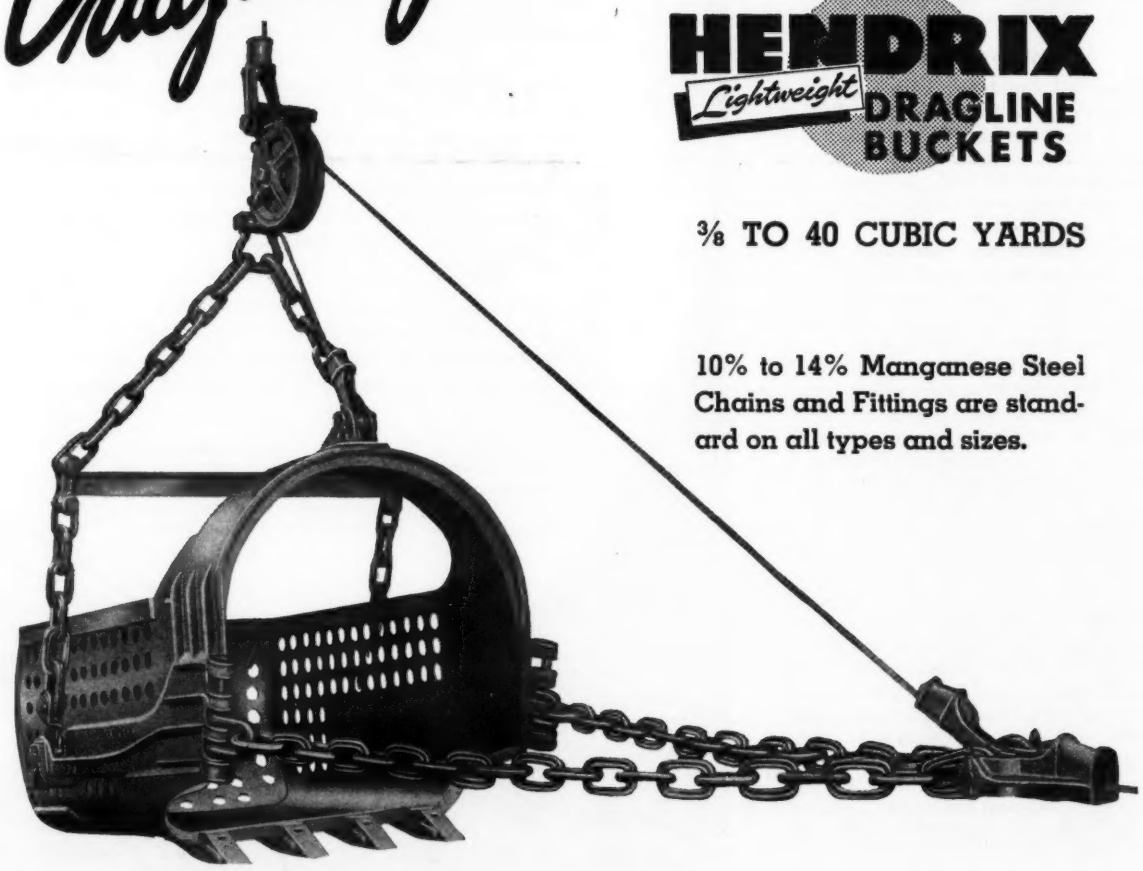

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Draglines Rip Clay On Irrigation Job

(Continued from preceding page)

gineering project. The irrigable lands are not all connected, and it has been necessary to build a great deal more mileage of main canal to reach all of them. While the nearest irrigable lands are only 38 miles from the dam, nearly twice that length of main canal will have to be built.

The initial construction, involving five tunnels ranging from 2,595 to 9,650 feet in length and numerous siphons and wasteways, has been particularly difficult. It traverses wild country. It winds around high on the escarpment of the great basin, cutting through Dakota and Wingate sandstones, Morrison shales, and the beautiful Triassic Red Beds common to this part of New Mexico east of the Continental Divide.

When the Terteling contracts reached into the irrigable farmlands, their machines ripped through deposits of heavy, hard-packed Montoya clays, which overlay the sandstones and shales. Dark reddish-brown sandy-clay loams and silt-clay loams also are found in the farming country.

The main canal in the Terteling contract has a carrying capacity of 260 to 384 second-feet, with a slope of 0.00013 to 0.00017 along the bottom. In this reach, it is 14 to 16 feet wide on the bottom, with 1½ to 1 side slopes, and is unlined. The 75 miles of laterals in the Terteling contract range from 3 to 12 feet bottom width, all with 1½ to 1 side slopes. All laterals are also unlined.

Dragline Excavation

When all canal excavation was bid unclassified, the Terteling organization did so knowing that it was taking a chance. The sandstones and shales which underlie the dark, brownish-red dirt were dangerously close to the surface in many places.

Three Northwest draglines were brought in to dig all canal excavation in cut sections. Tractor equipment was slated for those few sections where the canal had to be set within a fill.

One of the Northwest draglines, a Model 80-D with an Esco manganese-steel bucket, was started on the main canal and was kept busy on the biggest ditches. A Northwest Model 8 with a 2-yard Esco bucket worked in the intermediate to small canals. For the smallest ditches a Northwest Model 6 with a 1½-cubic-yard Yaun dragline bucket saw continuous service.

Cut stakes were set ahead of construction. As digging progressed these stakes were kept ahead by Bureau of Reclamation survey parties. With cuts roaded directly on the stakes, they were set on each side and on the center line at 100-foot intervals. On curves, stake centers were shortened up as necessary.

The draglines worked two 8-hour shifts each day and ordinarily accounted for good yardage. The Northwest Model 8 with a 2-yard bucket kept pace with or beat the 1,200-cubic-yard per shift production of the 80-D, while the Model 6 dug about 600 cubic yards per 8-hour shift on the smaller ditches.

C. & E. M. Photo

Left to right are E. C. Neill, Keith Horne, Project Engineer Glen Frizzel, and General Superintendent M. F. Moulton, photographed on the Terteling canal contracts.

According to General Superintendent M. F. "Buster" Moulton, the 2-yard gasoline rig set the pace for the larger and newer 80-D because of its operator, Paul E. Hatch, who is one of the best in the southwest.

"I saw the guy dig 1,850 cubic yards in a 4-foot-bottom ditch in 8 hours one day when he just happened to hit some good digging," Moulton remarked. "He didn't seem to be working so hard, either."

The dikes were later dressed by a D8-mounted Caterpillar bulldozer. Side slopes of the canal were dressed by a Caterpillar No. 12 motor grader, working from the canal floor. Excess dirt was smoothed out on the canal floor to bring it to its proper grade. The draglines dug 0.1 or 0.2 foot low as they went through to make room for this side-slope trimming.

Floodwaters, Rock

Weather Bureau records show that an average of 16 inches of moisture falls each year in this region, with about 12 inches during the summer growing season. Early in May the clouds turned loose with a tremendous deluge. The floodwaters ate out the sides of the excavated canal, undermined structures, trapped an air compressor and two bulldozers in a quagmire, and generally delayed the job by an estimated 30 days, according to the General Superintendent. But despite this exceedingly heavy rain the draglines continued to

(Continued on next page)

NO ENGINE HEART FAILURE THIS WAY . . .
A road-building job where there's both sand and dampness really tests a magneto, and the *new* WICO APH comes through with flying colors. Day after day fine abrasive dust sweeps around a continuously operating WICO APH. In another test, at a temperature of 100 and humidity of 95, a WICO APH gathers drops of warm moisture — and keeps right on producing a hot sharp spark on time every time.
This new magneto has several features that make it the finest made for continuous or stop-and-start service calling for exceptional stamina and ruggedness. The molded, insulated coil is stronger and has a solid plastic case. Two needle-type magnetic rotor bearings are easily replaced when necessary. On the flange-mounted models there is a leather oil seal backed with a spiral spring. The circulating oiling system provides a constant flow of oil to both bearings. Cam bearings are lubricated by a wick fed from the central oil reservoir.
WICO's APH is made in 1, 2, 4 and 6 cylinder models, S.A.E. flange or base mounted with built-in impulse couplings, either manually or automatically controlled. Supplied with either fixed or variable spark.
WICO is the world's largest producer of magnetos exclusively. Trained field engineers and more than a thousand authorized service stations serve WICO users everywhere. Wico Electric Company, West Springfield, Massachusetts.
WICO MAGNETOS
50 YEARS

C. & E. M. Photo

This Northwest Model 8 dragline with an Esco No. 370 rock bucket digs a rough section through caliche on a lateral canal of the Tucumcari Project.

work. It was necessary to help the grease rig out to the draglines by towing it with a tractor.

There were a number of occasions when the draglines found rock — some of it very hard — along the canal.

"It's spotty, though," Moulton explained. "You can't tell what the damn stuff will do. It might hold up for 500 feet or it might end in 10 feet. We've taken to drilling a few test holes as we go along through these questionable places. If it won't tear up the draglines, we sometimes let 'em keep on digging through a short stretch where perhaps we might get by a little cheaper with powder.

"We had to use powder on about 500 feet so far, though," he grinned good naturedly. "That stretch was real solid rock."

Hard-facing was required on all dragline buckets, with welders working when the machines were idle.

A 13-day labor strike early in the job caused the work schedule to be shifted from a 7-day arrangement to a straight 40-hour work week, because of the disruption of bid estimates by the higher labor prices. Thus the draglines worked five days per week, two 8-hour shifts per day, with all other excavating equipment working under the same arrangement.

Excavation by Tractor Equipment

Where sections of the canal had to be built up through low country, two 20-yard Model W LeTourneau Carryalls saw service, along with a Caterpillar DW10 wagon. The Carryalls were pulled by Caterpillar D8's, with a D8 in the borrow pit as a pusher. Some of the hauls for the DW10 and the Carryalls were as long as 4,000 feet. Small amounts of caliche and soft Wingate sandstones were permissible when the silty-clay outcrop was thin over the borrow pit. A K-30 LeTourneau Rooter was necessary in most borrow work, and water was applied in the pit by two 4,000-gallon sprinkler tanks, one 2,500-gallon unit, and a 2,000-gallon tank.

The contractor had to carry on a thorough search for water. A 13-mile haul from Tucumcari was necessary for a while. After the big rain, the trucks could re-fill in the main canal about 6 miles from the fill sections.

The earth hauled in by the tractor equipment was dumped and spread in 6-inch layers by a No. 12 Caterpillar motor grader. Additional moisture was then added by a sprinkler truck and the lift rolled by LaPlant-Choate tandem sheepsfoot rollers behind a Caterpillar D8 tractor. Density tests were taken regularly each day, with a Bureau requirement of at least 95 per cent of laboratory weights.

All of the excavating units were serviced once each shift by a traveling truck-mounted lubrication and fuel rig. With the job scattered out over an area about 14 miles from one end to the other, the service unit had quite a busy time.

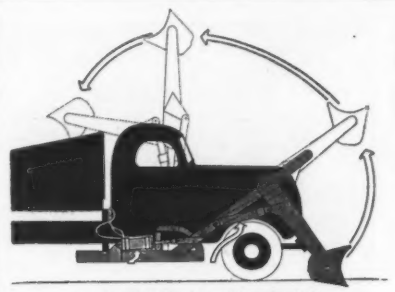
Concrete Structures

One of the most important parts of the two contracts provided for more than 1,000 various concrete structures. This statement holds true both from the Terteling Co. viewpoint, and also from that of the Bureau of Reclamation. From the contractor's standpoint, these structures were highly important because normally they would involve so much labor, now the difference between profit and loss. And from the Bureau angle, these checks and drops and weirs and other structures are vital parts of a water-distribution system.

Much of the form work on these structures was done in a carpenter yard at the batch plant, near the Rock Island railroad siding at Hudson, N. Mex. Considerable plywood and other form lumber was imported by Terteling from a recent warehouse project near McAlester, Okla., and additional form lumber was ordered from the west coast.

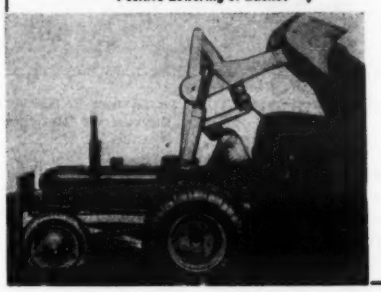
After the forms were built, a flat-bed truck hauled them out to the site where they were unloaded. The form faces were generally made of plywood, with

(Continued on next page)



▲ Complete Digging and Loading Unit

Positive Lowering of Bucket ▼



FAST EFFICIENT LOADING IN ONE OPERATION

Years of research and grueling service have proved the ability of the Owen Loader to stand up under the toughest digging and loading jobs. Easily mounted on standard trucks and tractors. Write for detailed information on how it will speed loading on your jobs.

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LION Naturalube D.H.D. OIL

RESISTS SLUDGING • REMOVES CARBON

More Power — Lower Operating Cost

Naturalube D. H. D. Oil is refined from a basically different crude oil that has amazing natural properties. Because of them, D. H. D. is able to loosen and remove hard carbon *naturally*. It has greater natural ability to penetrate to all parts of an engine. It has greater natural ability to *cling* to those parts. You get the constant wear-saving protection of a naturally tougher oil film. And D. H. D. is non-corrosive — safe!

In addition, Naturalube D. H. D. is specially reinforced to give greater resistance to the formation of power-destroying sludge and lacquer.

D. H. D. gives you these big advantages in road building and heavy construction operations: less wear, fewer repairs, more power from a cleaner engine, and lower operating and maintenance costs. Leading engine manufacturers accept Naturalube D. H. D. as a superior lubricant.

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The Naturalube Guarantee —

If you don't believe Naturalube D. H. D. is the best oil you have ever used, Lion Oil Company will give you your money back.

LION OIL COMPANY — LION — EL DORADO, ARKANSAS

Draglines Rip Clay On Irrigation Job

(Continued from preceding page)

2 x 4-inch studs on 16-inch centers secured by double 2 x 4-inch pieces for wales. Tie bolts were set through the wood forms after they were inspected for any breaks, repaired if necessary, and set in place.

The Terteling organization was able to dispose of a great deal of the hand labor usually necessary in pouring these small structures, because the new mobile system is much more economical and efficient. The 1,000-plus structures contain only 10,000 cubic yards of concrete, so most of the pours were tiny. The biggest structure in the job contains only 110 cubic yards.

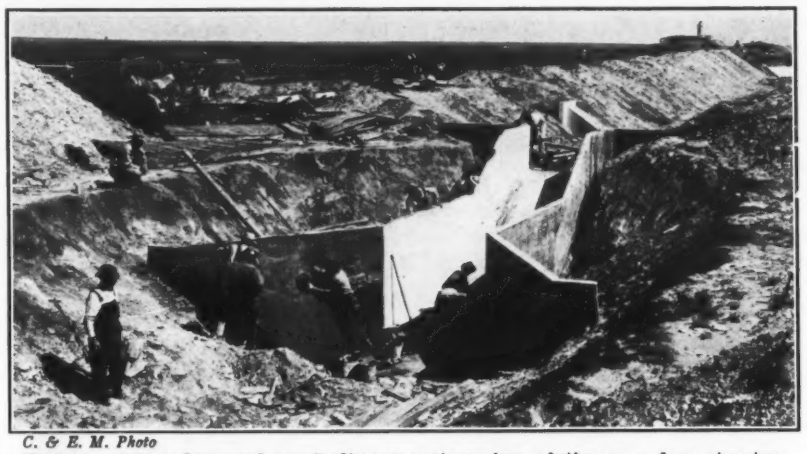
All mixing equipment for the job was mounted on a semi-trailer, and a Browning truck crane on a Mack truck was used to place the concrete on all pours. It replaced the usual "wheelbarrow brigade" employed on such work.

The semi-trailer contained a Kwik-Mix Dandie 3-sack concrete mixer for working the dry batches, two 500-gallon water tanks to hold the mixing water, a Wisconsin-driven Rex 2-inch pump to transfer water to the mixer, a Le Roi-driven Marble 5-kw generator set to furnish power for the Viber electric vibrator used in consolidating the concrete, and the usual fuel and curing drums. The small mixer is equipped with a Koehring Batchmeter and water-measuring meter.

The Bureau of Reclamation furnished sand and 1½-inch rock from its gravel pit about 8 miles from Hudson. These materials were trucked to the Johnson batching bins at the Hudson railroad siding, and transferred to a Barber-Greene conveyor by an Osgood truck crane. Pea gravel was furnished by Terteling from a commercial deposit about 26 miles north of Hudson, and shipped by railroad to the job. Ideal portland cement in bags was used. It came in by railroad car and was stored in a warehouse. Three bags were loaded to the top of each batch before the batch trucks left for the job.

Four batch trucks were used; a war-surplus GMC hauled eight 3-sack batches; two Chevrolets and a Ford each hauled five batches of the same size. The batches were weighed out according to the following dry design:

Sand	645.9 lbs.
Cement	282 lbs.
Pea gravel	496.2 lbs.
1½-inch rock	606.3 lbs.
Water	20 gals.



C. & E. M. Photo

Workmen strip a form and use Sealtex concrete-curing solution on a drop structure of the Bureau of Reclamation's Tucumcari Project.

The batch trucks discharged to the mixer skip after a man opened the sacked cement. Mixing time was about 2 minutes. The concrete was treated with a pint of Darex AEA solution per batch. This Darex solution is made by diluting the Darex air-entraining agent one part to four parts of water. It increased the workability of the concrete remarkably well, with better surfaces on the small structures reported.

The concrete was transferred from the mixer to the pour by a ¾-cubic-yard bottom-dump bucket with a heavy canvas skirt, handled by the Browning truck crane. Superintendent Moulton said he planned to change the mixer around soon, putting it on a truck bed with its skip at the back. In this position, it would discharge from either side, increasing the accessibility of any set-up for pouring.

The Viber electric vibrator mounted on the semi-trailer was used to consolidate the concrete. After the pours were steel-troweled on the exposed tops, these surfaces were sprayed with Sealtex white-pigmented concrete-curing solution. The same cure was sprayed on all pours after they were stripped.

(Concluded on next page)

LINNS

TAKE TRUCK-STOPPING FOOTING IN STRIDE

Here is a LINN owned by the STURM & DILLARD CONSTRUCTION COMPANY moving a *heavy* payload over truck stopping terrain . . . a railroad relocation job that requires all weather equipment . . . a natural for the LINN HAFTRAK.

The LINN *flexible* traction unit fits itself to the footing on any job—it follows the terrain contour, biting in to give maximum traction over rocks, mud, clay, stumps, ice, snow or severe grades. The tracks are extremely wide, insuring adequate traction and preventing "sinking in" on soft or boggy ground.

For your next TOUGH contracting job try a LINN for haulage. Available with capacities from 5 to 50 tons in a variety of body styles for all types of work. For specifications write to our General Sales Office, 250 West 57th Street, New York 19, N.Y.

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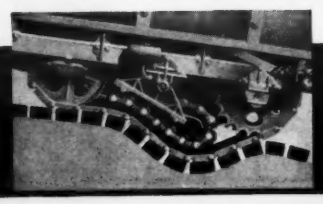
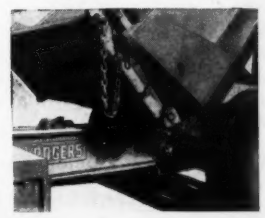


LINN HAFTRAK CONTOUR TRACTION

1 LOAD FROM THE FRONT

2 CONNECT TO YOUR DUMP TRUCK

Showing cable around sheave and dump body about to be raised to engage towing tongue.



Body elevated. Tightened cable has raised drawbar and engaged towing tongue. Safety coupling pin is inserted.

and you're 3 READY TO ROLL with "TAGALONG" Front Loader

PATENTS PENDING

A welcomed boon to contractors everywhere, the "Tagalong" frontloader requires no tractor. Light and medium shovels, cranes, bulldozers, etc., are moved to and from the job rapidly and economically, with your dump-truck doing double-duty.

Equipment used to adapt the truck constitutes a negligible weight and does not in the least impair usefulness of the vehicle.

THE INSTALLATION IN NO WAY OBSTRUCTS THE DUMP BODY OR ITS NORMAL OPERATION.

Write for particulars.

ROGERS BROS. CORP.

DESIGNERS and BUILDERS OF HEAVY DUTY TRAILERS SINCE 1915

EXPERIENCE builds 'em PERFORMANCE sells 'em

108 ORCHARD ST. ALBION, PENNA.

C. & E. M. Photo
Pay dirt! This 2½-cubic-yard bucket dumps its load of caliche and earth to make a levee along the Conches Canal, in New Mexico.

By cutting out all the unnecessary labor and making concrete pouring a mobile, mechanical operation, Terteling speeded up pours to the point where carpenters were working like mad to keep ahead of the pouring equipment. In general, about 60 cubic yards a day was handled in the single shift worked, and considering the extent of form work necessary for the carpenters, it amounted to a great deal of work.

Safety Aspects

J. A. Terteling & Sons, Inc., is one of the most safety-minded contractors of the west, having twice won the coveted Swenson Trophy. Safe practices on a Terteling job are so deeply implanted in all foremen that the casual visitor seldom notices them, simply because all the foremen are thinking and practicing them instead of merely talking about them. When forms are stripped, they see to it promptly that the mess is cleaned up; boards with protruding nails are burned or re-used; and down on the dirt work you will see operators shut off a diesel engine while refueling.

They are simple little things, but close observance of them means accident prevention. Safety meetings are held, when possible, once a week. When a foreman's record is marred by an accident to one of his men, rumor has it that he gets a personal letter from Joe Terteling . . . not exactly the kind to which he can point with pride.

Personnel

The project is being administered under the general supervision of the Regional Director of the Bureau of Reclamation with headquarters offices in Amarillo, Texas. M. M. Starr is the Construction Engineer on the project.

On-the-job direction of the Terteling contracts is performed by General Superintendent M. F. Moulton. Glen Frizzell is Project Engineer; W. A. Sisson is Concrete Foreman; H. D. Durston is in charge of form building; with R. P. Gammill in charge of the batch plant.

With the completion of these two Terteling contracts, the Bureau of Reclamation estimates that 23,000 acres of the original 45,000 potentially irrigable acres will be ready for use. The first unit in the project took water in 1946, and showed a gross income of $86 per acre.

It is estimated that the Tucumcari Project will cost the United States Government $17,200,000. A portion of this amount will be repaid by the users.

Believing that it has a definite stake in this and other projects, the Bureau has also started to furnish crop planning and other technical help to farmers. Such help coincides with the decentralization of the Bureau and establishment of its regional offices. As one official put it, "We have such a big stake in this project that we feel we have a right to insist it be started off to a successful life".

Dump-Truck Hoists' Bodies

A folder describing its hoists and dump-truck bodies is being distributed by the St. Paul Hydraulic Hoist Division of Gar Wood Industries, Inc., 2207 University Ave., S. E., Minneapolis 14, Minn. Folder No. 47-1 covers the Model No. 7 hoist, and the 500 and 600 Series bodies.

The folder shows a large photograph of the No. 7 hoist with line drawings of little mechanics pointing out its features of construction. Also described are the drive shaft, power take-off and controls, and pump for the hoist unit.

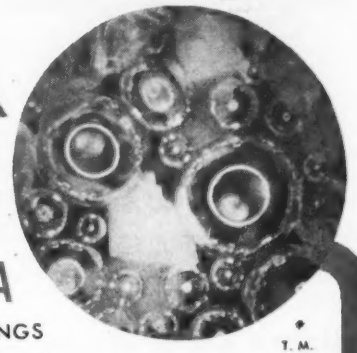
The steel 500 and 600 Series of truck bodies are also discussed in this folder.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 75.

I-H Shifts Hanson, Dean

Laird A. Hanson has been appointed Supervisor of parts and service merchandising by the Motor Truck Division of the International Harvester Co., Chicago. Mr. Hanson replaces M. D. Dean, who has been appointed Manager of the Wichita truck branch.

That's DAREX ENTRAINED AIR



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ACTS LIKE ROLLER BEARINGS
TO LUBRICATE THE CONCRETE MIX

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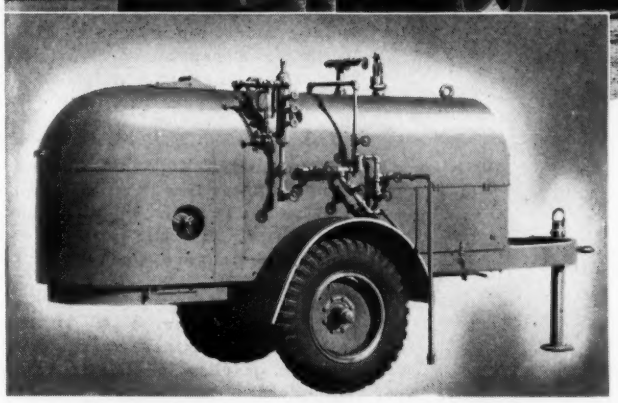
Readily Available from Your Distributor

DEWEY AND ALMY CHEMICAL COMPANY
CHICAGO, ILL. CAMBRIDGE, MASS. OAKLAND, CAL.

"Johnny-on-the-SPOT" when you've got to pour it HOT!



Mobile tank-car heater available in two and three tank car heating capacities. Oil-fired with extra high heat transfer flue-travel; dry coil steam condensate return under pressure — no water or heat losses.

Cleaver-Brooks Mobile Tank Car Heaters Give You:

- Fast Steaming — 20 minutes from cold water start to 125 lbs. steam pressure.
- High heat transfer — low fuel consumption — minimum water losses.
- Year-round application. Besides tank-car heating, it can be effectively used for steam cleaning, catch basin thawing, culvert thawing, etc.
- Trailer or truck mounting for quick job-to-job transport.

Get the Steam you Need for Fast Tank-Car Heating... USE LESS FUEL, LESS WATER AND LESS WORK

THE tank car on the siding is the starting point for fast work on any project requiring the heating and handling of bituminous materials. The quicker the material is heated to application temperature and flowing into the distributors — the faster your road crews can get going.

But that's not all — the Cleaver-Brooks tank car heater is an all-purpose unit when it comes to providing a source for steam and heat for thawing, cleaning and other heating requirements.

It's so readily portable, that it can go anywhere you can take a car or truck. This feature alone makes it one of the handiest tools for a wide range of construction operations. For more information write for bulletin.

CLEAVER-BROOKS COMPANY
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Cleaver-Brooks PIONEERS AND ORIGINATORS OF
TANK CAR HEATERS... BITUMINOUS BOOSTERS... AUTOMATIC STEAM PLANTS

This new Brunson dumpy-type level, ball-bearing-mounted, is especially designed for rugged service.

Builder's Level Is Ball-Bearing Mounted

A new level for use by contractors and engineers has been announced by The Brunson Instrument Co., 1405-07 Walnut St., Kansas City, Mo. Of the dumpy type, it is mounted on ball bearings which are permanently lubricated and sealed against dust. Clamps and screws are enclosed in the body casting, and the unusually large circle for easy reading is also enclosed and covered with a window.

This Model No. 60 level has a 12-inch erecting image telescope. Magnification is 18 diameters. Minimum focus distance is 6 feet. Furnished with the level is a hardwood box, top opening with brass hinges and hooks, rubber bumpers, and a leather strap; plumb bob and cord; adjusting pin; and an instruction booklet.

Standard equipment includes a 58-inch fixed-length tripod, but removable trivot points allow the leveling head to be used on any surface. Available as optional equipment is the No. 220 extension tripod which, extended, is 58 inches long, and folds to 35 inches.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 5.

Small Gas Engines Made in Six Models

A line of gasoline engines for powering various types of construction equipment is made by the Cushman Motor Works, Inc., 21st & Y Sts., Lincoln 1, Nebr. They vary in range from 1½ to 4 hp. The 1½, 2, and 4-hp Husky engines are air-cooled; the 2, 3, and 4-hp Cub engines are water-cooled. Slow-rotation is a feature of the water-cooled engines, the Cubs reaching their rated horsepower at about 750 rpm.

A combination natural-gas or gasoline carburetor is available on the Cubs. The engines are started on gasoline, and can then be switched to natural gas at any time. They will run intermittently or continuously on either fuel. Two heavy, opposed flyballs on the crankshaft are used to regulate engine speed. The engines employ Wico high-tension magnetos.

The 1½ and 2-hp air-cooled Husky engines are available in either clockwise or counter-clockwise rotation. Crankshaft extensions of 4⅜, 3½, and 1¼ inches are available. The crankshafts are ¾ inch in diameter. Standard equipment includes exhaust muffler, throttle governor, and float-feed carburetor with gasoline filter. Special equipment includes oil-bath air cleaner, foot starter for anti-clockwise engines, drive pulleys for flat or V-belts, and a 4-inch cone clutch for the 1½ and 2-hp units.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 19.

Solvay Moves Two Offices

The relocation of two of its branch offices has been announced by the Solvay Sales Corp., New York City, distributor of calcium chloride for surface binding. The New Orleans branch is now located at 1107 Pere Marquette Bldg., Baronne St.; and the Houston, Texas, office is now established at 1313 City National Bank Bldg., 921 Main St.

Pile-Driving Engineers

A catalog describing various types of concrete piles and the theory behind their use can be secured from the MacArthur Concrete Pile Corp., 18 E. 48th St., New York 17, N.Y. Feature of the catalog is an illustrated description of the construction and driving of straight-shaft piles, pedestal piles, permanent-cased piles, and composite piles.

The announcement describes the MacArthur organization and the services which it is equipped to offer. It tells of the company's Soil and Rock Boring Service, of its consultation and engineering service, and of the equipment it uses. It also shows photographs of several typical buildings supported by MacArthur piles.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 73.

MULLER MIXER TRADE MARK

MANUFACTURERS OF

HALF-BAG MIXERS
PORTABLE FARM MIXERS
CONCRETE CARTS
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MORTAR BOXES

MULLER MACHINERY COMPANY INCORPORATED
METUCHEN, NEW JERSEY

THE HUBER ROAD MAINTAINER
PATCH ROLLER
LIFT LOADER
CAB
ONE WAY SNOWPLOW
TWO WAY SNOWPLOW
BULLDOZER
BROOM
HUBER
OFFERS A COMPLETE LINE OF PROVEN ROAD MACHINERY
To standardize on Huber Road Machinery is to place your road, street, highway and airport construction and maintenance requirements in the hands of a capable organization of long experience and thoroughly acquainted with your problems.
THE HUBER ROAD MAINTAINER
is a versatile, dependable, economical machine that through its auxiliary units makes it a "One Man Maintenance Crew" for all types of year 'round maintenance work.
HUBER 3-WHEEL ROLLERS
Built in sizes from 5 to 12 tons – powered with either heavy duty 6 cylinder gasoline or Diesel engines. Dependable – economical – powerful.
HUBER VARIABLE WEIGHT TANDEM ROLLERS
5 to 12 Ton capacities – modern design – streamlined, sturdy construction – three speeds forward and reverse – dual control – and many other desirable Huber features. (Also a 3-4 Ton Trailer).
5 and 6 TON 3-WHEEL ROLLER
8 TON 3-WHEEL ROLLER
10-12 TON 3-WHEEL ROLLER
3-4 TON TANDEM ROLLER
5-8 TON TANDEM ROLLER
8-12 TON TANDEM ROLLER

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

HUBER

3 Wheel • Tandem

ROAD ROLLERS and MAINTAINERS

The new Wagnermobile lift truck will lift 6,000 pounds 8 feet. Quick-change attachments include crane boom, lifting fork, and ½ and ¾-yard scoop buckets. It is hydraulically controlled.

Heavy-Duty Lift Truck

A rubber-tired end-loading-type lift truck has been developed by Mixermobile Manufacturers, 6855 N. E. Halsey St., Portland 16, Oreg. The Wagnermobile features a telescopic lifting elevator which will raise a load of 3 tons to a height of 8 feet, or a load of 2 tons to a height of 11 feet.

Steering, lift, and tilt control are all hydraulically operated. Attachments include a ½-cubic-yard scoop, a ¾-cubic-yard scoop, and a fork. With the lift in the lowered position, there is no obstruction in front to mar the operator's visibility. An enclosed cab is available as optional equipment.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 21.

Concrete Vibrator

A concrete vibrator designed for heavy-duty work has been placed on the market by Aristo Power Tools, Inc., 601 W. Washington Blvd., Chicago 6, Ill. Powered by a 4-hp air-cooled Wisconsin engine, it has a vibrating speed of 8,000 rpm per minute.

The vibrating head has two single rows of anti-friction ball bearings at each end of the rotor shaft and a single ball thrust bearing in the head. The jackshaft is a heavy-duty member equipped with two double-row radial-thrust ball bearings. The clutch is said to engage automatically at an engine speed of 1,750 rpm.

The stand of the AristoCraft vibrator has wheelbarrow-type handles. The engine swivels independently of the stand. Drive is through a twin V-belt with belt guard. A positive lock is provided for belt adjustment.

AristoCraft vibrators are built in nine models: four with gasoline engines and five with electric motors. Concrete-finishing tools available as attachments include grinders, sanders, and wire brushes.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 46.

Light-Weight Grinder

A 2-wheel bench grinder weighing 7½ pounds has been announced by the Speedway Mfg. Co., 1834 So. 52nd Ave., Cicero 50, Ill. Current requirements are 110 to 120-volt ac. Speed of the unit is said to be 3,400 rpm. The grinder wheels—one coarse and one fine—are 4½ x ⅜ x ⅜ inches.

The Model No. 117 grinder is 6 inches high and 8 inches in length. Rubber feet are provided to hold it firmly in place when used in temporary positions, or it can be bolted to a shop bench. It is rated at 1/15 hp, intermittent duty. A one-piece cast-aluminum case houses the motor, shaft, and bearings, and provides integral wheel guards and tool rests.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 35.

Truck-Mounted Hone For Mixing In Place

A truck-slung road hone for use in processing or maintaining gravel, stone, dirt, cinder, or low-cost bituminous roads is made by the New England Road Machinery Co., 801 E. 6th St., South Boston 27, Mass. Flexibly attached to the truck by hydraulically-controlled chains, its seven blades are said to do a thorough job of mixing or leveling. Three sets of ½ x 6-inch high-carbon-steel blades move the material back and forth across the road, and the rear leveling blade completes the process.

A dual hydraulic device, operated from the truck-driver's seat or a seat at the rear of the hone, controls front or rear-blade height. Road crown may be raised or lowered by a chain adjustment. The rear 8-foot-long finishing-off blade can be set straight or at an angle. Uneven motion of the truck is said to be compensated for by the chain suspension.

Scraping width can be varied from 7 feet 3 inches to 8 feet. Overall width of the unit is 8 feet 3½ inches; length 14 feet 3 inches; weight 1,900 pounds.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 12.

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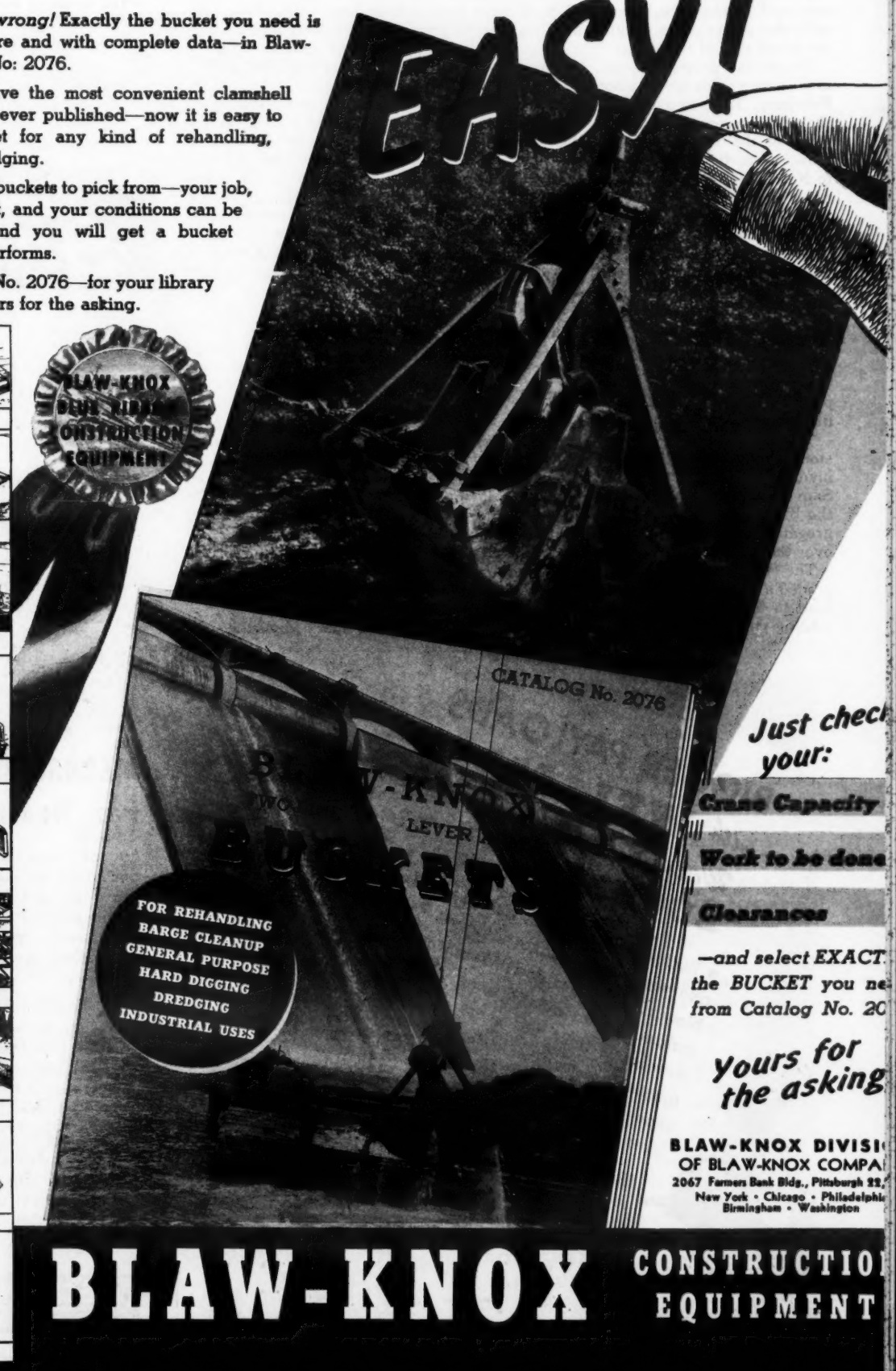

BLAW-KNOX CONSTRUCTION EQUIPMENT

Concrete Dam

(*Continued from page 2*)

40,000-kva generators; and a service turbine-generator set passing about 200 cfs for 2,500 kva. The Department of the Interior will sell the electrical energy under regulations established by the Federal Power Commission.

The improvement will require raising the grade along a section of U. S. 41 near Acworth, and relocating a stretch of the Nashville, Chattanooga & St. Louis Railway.

Access Roads

Prior to the present construction, the site was reached only over a narrow county road north of the river. Now the dam is served by two access roads, one on the north and the other on the south side of the river. The north access road runs 4½ miles from State Route 20 to the right bank of the river. It will eventually cross the top of the dam, and dead-end in a turnaround on the left or south bank. The south access road, 3 miles long, connects U. S. 41 with the powerhouse parking area on the south side of the river.

To get the project started, Government forces with hired labor began in February, 1946, to clear the route of the south access road, and to work on some of the 15-foot sidehill fills. In June, when the contract was awarded to National Constructors, Inc., the lowest of the five bidders, the Government withdrew its forces to let the contractor complete the south access road and construct the north access road in its entirety.

The prime contractor then sublet the construction of the access roads to the Carlton Contracting Co. of Albany, Ga. About 300,000 cubic yards of dirt and rock was moved in the construction of these roads; excavation at the dam site provided the necessary material for the fills.

The roads have a 6-inch crushed-stone base course, topped by a 2-inch layer of asphaltic hot-mix 20 feet wide. Sam Finley Co. of Atlanta, Ga., handled the bituminous paving work. The aggregate for the concrete is being hauled over the north access road.

The Carlton Contracting Co. also graded a 7-acre site off the south access road to be used as a storage and unloading yard for all material delivered to the project. Nearly 1½ miles of track were laid as a siding and connection to the N. C. & St. L. Railway. At one end of the cleared site 1½ acres were set aside as a fabrication yard for the steel penstocks which are being supplied by the Chicago Bridge & Iron Co. The three main penstocks (one penstock is for a future unit) are 250 feet long with a diameter of 20 feet; the service penstock is 295 feet long and 5½ feet in diameter.

In addition to the main access roads, the contractor also had to build job roads to reach the various working areas of the project. Two of particular interest, because of the steep grades, wind up the hills on each side of the river to the head and tail-tower benches.

About 1,200 feet below the dam, taking advantage of two islands in the river, the contractor built a job bridge to reach the work area and shop layout along the right bank. The total length of the bridge, which is really three spans linking the islands with the river banks, is 650 feet. Earth dikes were built out to the islands so that heavy equipment could be used to construct the bridges from both ends. Four concrete piers were poured, and timber-crib abutments filled with heavy stone were erected to carry the steel girders of the superstructure.

The bridge has seven 60-foot spans in addition to the earth fills on the islands. The wood-deck roadway is 12 feet 6 inches wide, and has a 3-foot 2-inch sidewalk on the west side. The bridge has a capacity of 75 tons at slow speeds, and also carries 6-inch compressed-air and water lines. Its roadway elevation of 715.0 is the same as that of the area where the contractor's shops are located.

The Shop Area

One of the contractor's first moves was to get material to build up the shop area along the right bank of the river to elevation 715.0; this amounts to 13 feet high, or 5 feet higher than the maximum recorded flood level. In excavating the north-abutment keyway, enough dirt and rock was knocked down to make the necessary fill. On this site were erected the contractor's office, hospital, warehouse, shop, cement shed, compressor building, transformer hut, carpenter shop, and equipment-storage building; also the Corps of Engineers laboratory.

Power and light are supplied to the site from a 38,500-volt line of the Georgia Power Co. from one of its substations on the north bank. From there, 2,300-volt 60-cycle job power lines run out to the various parts of the project where current is needed. The contractor furnished four Allis-Chalmers 1,000-kva water-cooled transformers for the substation.

Excavation

When the job access roads were completed, one to the north sidehill where the concrete plant is located, and the other to the tail-tower site on the south hill, benches were excavated at these two places. On the north hill the bench was cut out to elevation 915 to 920 by

(*Continued on next page*)

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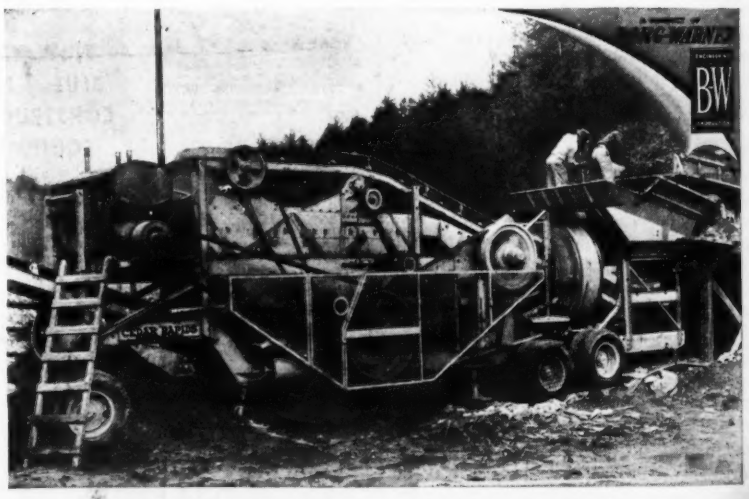

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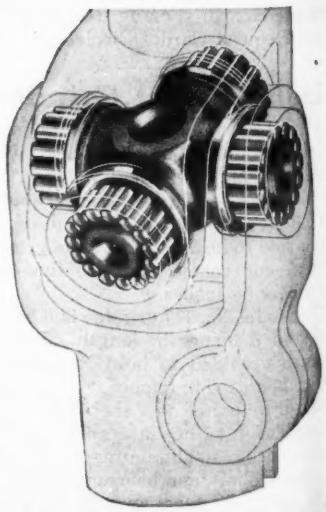

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removing some 35,000 yards of material; this provided space for the concrete plant, the head tower for the cableway, and a work area for the construction of the timber draft-tube forms. On the opposite side, the bench for the cableway tail tower involved the removal of 68,000 yards of material, mostly rock.

Next the keyways were completed all the way from top to bottom on both sides, by cutting out the abutment benches. This was done first on the north side so this material could be used for the shop-area fill, and then on the south abutment.

North-abutment excavation started on the top. The sequence of operations consisted of drilling blast holes, shooting the charge, and dozing the blasted material over the bank where it was picked up below by shovels and loaded into trucks. The average haul was ½ mile to the shop area below the dam site on the same side of the river.

The south abutment had four main benches, the lowest at elevation 693.0, the next at 728.0, above which the rock sloped to the third bench at 795.0. A vertical rise reached the fourth bench at 817.50, and then the foundation sloped back to a top elevation of 846. The original ground at this point was around 950.0.

South-abutment excavation was carried down in steps or benches, 20 feet in depth. The sequence of operations consisted of drilling and blasting, loading the blasted rock with shovels into trucks, and hauling it to a spoil bank upstream of the dam site on that side of the river at elevation 800 below the draw-down elevation of the lake. Some of the material was used to construct a 3,500-foot-long x 15 foot-high fill for the dam end of the south access road.

Equipment

For drilling rock the contractor used 12 Ingersoll-Rand wagon drills with 1¼-inch round drill steel, and 24 I-R Jackhamers with 1-inch hexagonal steel. I-R Jackbits, Type 2 for the wagon drills and Type 1 for the Jackhamers, were used, ranging in size from 2⅝ down to 1⅜-inch.

Compressed air was supplied by four Ingersoll-Rand compressors: two 805-cfm, one 754-cfm, and one 365-cfm; and two Gardner-Denver 360-cfm units. The compressors pumped air into a cylindrical receiver, 14 feet long x 54 inches in diameter, located at the compressor house. From there it was conveyed through 6-inch lines to wherever it was needed.

C. & E. M. Photo

Within the cofferdam, a Link-Belt Speeder 2¼-yard shovel loads an end-dump Euclid which has a 15-yard rock body.

Drill holes varied in depth from 3 to 24 feet, and were spaced anywhere from 3 to 10 feet on centers. Du Pont 40 per cent dynamite was used to charge the holes; very little secondary shooting was necessary. An average of 1.1 pounds of gelatin was required to blast out 1 cubic yard of material.

North-abutment blasted rock was pushed over the hill by a Caterpillar D7 tractor-dozer. At the bottom it was picked up by a Lima ½-yard shovel. South-abutment rock was loaded by a second Lima 1½-yard, a Koehring 2-yard, and a Link-Belt Speeder 2¼-yard shovel. A fleet of 12 end-dump Euclids with 15-yard rock bodies hauled the material away. Two additional D7's and a D8 tractor-dozer completed the list of excavating equipment.

First-Stage Cofferdam

As the excavation proceeded on the abutments, the construction of the first-stage cofferdam started on October 10, 1946. Within this cofferdam the south half of the dam is being built, also the south half of the stilling basin, 180 x 360 feet and from 4 to 6 feet in depth, the tailrace, and the powerhouse. The river was at its lowest stage at this

(Continued on next page)

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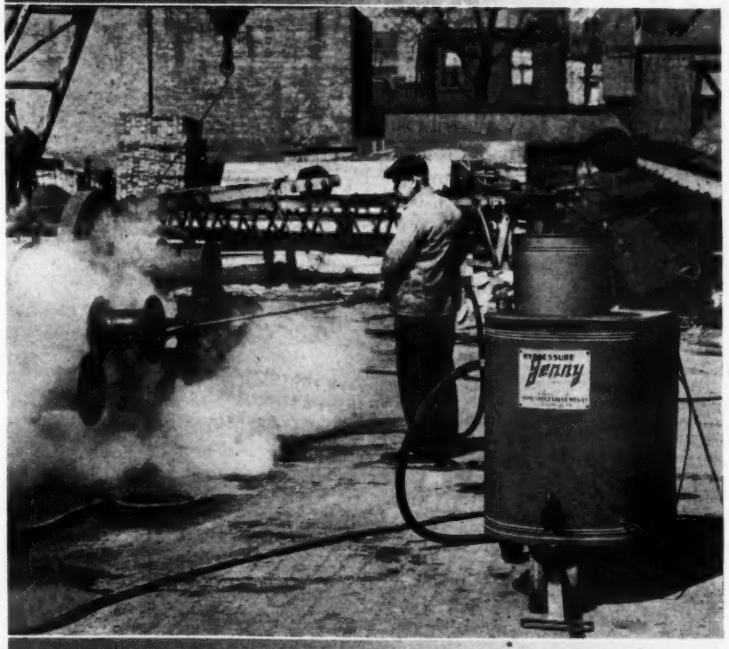

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* *Names on request.*

HYPRESSURE JENNY DIVISION
Homestead Valve Manufacturing Company
P. O. Box 30 • Coraopolis, Pa.

Concrete Dam

(Continued from preceding page)

time, running from 5 to 7 feet deep.

A dumped fill, or construction embankment, was made on the inner line that the cofferdam was to take, and on this dike a double track was laid on a 21-foot gage. On the track rode a 30-foot-high gantry carrying a Clyde whirley steam crane with a 100-foot boom. As the crane advanced, it laid its own track, drove the piles for the cofferdam, and picked up its tracks behind. Driving was done with McKiernan-Terry hammers, either a No. 7 or a No. 9.

The cofferdam consists of circular cells of sheet piling driven with a diameter of 40 feet 9 inches, on 48-foot 3-inch centers. These are joined by connecting cells which have 24-foot diameters. The interlocking piles are either Bethlehem SP4 or Carnegie M112 sections; their lengths vary from 20 feet at the downstream end to 42 feet at the upstream end.

They were driven with little penetration—at the most, 3 inches—into the hard gray schist of the river bottom. To get the proper circular outline for the cells, a double-deck circular timber template was first spotted in place and secured by four 27-inch I-beam spuds 45 feet long, with the decks held 11 feet apart by spacers. The sheeting was then driven and locked in place around this form.

From 5 to 6 feet of clay was then dumped on the bare rock within the cell to form a seal. The clay was obtained from a pit upstream of the dam where it was excavated by a shovel and loaded into the Euclids. It was placed in the cells by a Lima crane with a 55-foot boom and a 1½-yard clamshell bucket. The remainder of the fill in the cells consists of pervious material to relieve any hydrostatic head that may arise in the cofferdam. When the cells were half full, the template was removed and advanced to the next cell; then the balance of the cells was filled by end-dumping directly from the trucks.

Two emergency sluiceways were provided so that the interior of the cofferdam can be flooded in case an overtopping of the structure seems imminent. These were formed by leaving out two of the smaller connecting cells and closing up the gaps with 8-foot-long timbers which can be easily removed in a hurry.

No blanket of material was required on the outside of the cofferdam, but the cells were filled to the top on the inside. As work progressed from the upstream side around, the trucks used the completed top of the cofferdam as a haul road for bringing in the material with which to fill up the space inside the sheeting.

For the first-stage cofferdam 27 cellular sections were required, the first seven cut across from the south bank of the river to midstream, and the others continuing on downstream and finally cut back to the south bank again. A working distance of 570 feet across the river is enclosed within the cofferdam which is designed to withstand 25,000 second-feet of flow.

C. & E. M. Photo
Inside the cellular steel pile cofferdam, we see a battery of Ingersoll-Rand wagon drills used to drill blast holes for the powerhouse foundation.

The cofferdam was completed on February 10, 1947, after being delayed for six weeks at one time when the steel mills were unable to make delivery on the sheet piling. Material was shipped either from the mills at Bethlehem, Pa., or from Chicago, Ill., by rail to the job siding. There it was unloaded by a Lorain T-20 truck crane and then hauled to the site on a Federal trailer truck.

South-bank abutment excavation was slowed down to key in with the delayed progress of the cofferdam. Thus when the coffer was completed the streambed area was next in line for excavation. A good tight cofferdam was obtained which was pumped out with only three pumps—one 6-inch and two 4-inch Gorman-Rupps. Excavation for the powerhouse went down through rock to elevation 662, using the same equipment as in the south-abutment work.

Grouting

Foundation grouting will be done later by secondary, high-pressure, deep-hole grouting from the gallery that runs within the dam from one side to the other. Three-inch pipes for grout

(Concluded on next page)

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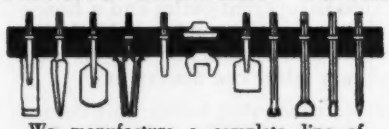

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holes are spaced 5 feet on centers on the upstream side of the gallery. The gallery is 6 feet wide x 8 feet high, about 12 feet downstream from the face of the dam, and 7 feet above the rock foundation. Holes 5 inches in diameter will be drilled on 5-foot centers on the downstream side of the gallery to drain any uplift water into the gallery.

Second-Stage Cofferdam

By January, 1948, the secondary diversion of the river is expected to be made by constructing the second-stage cofferdam. The upstream and downstream wings of the first, or south, cofferdam will be removed. Cells will then be built across the river to tie in to the north bank both above and below the dam. Other cells will be constructed to tie in the section of the dam already poured with the downstream wing of the new coffer. The cells will be removed from the middle of the river.

The stream flow will be carried through the south half of the dam via one 50-foot-wide monolith which will be left low, and in two of four permanent sluiceways. These passages through the dam are almost down to bedrock, and measure 5 feet 8 inches wide x 10 feet high. Then the north half of the structure will be constructed.

Quantities and Personnel

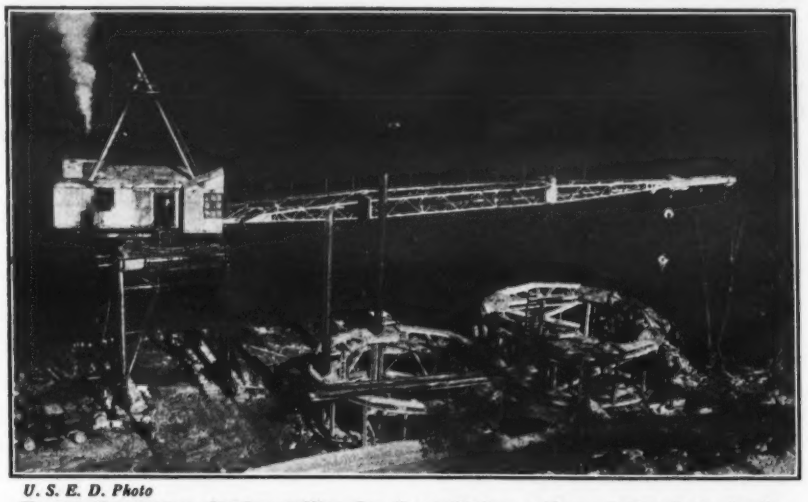
The major items in the dam contract, exclusive of the quantities for the construction of the access roads, include:

Unclassified excavation	443,000 cu. yds.
Cement for pressure grouting	18,000 bags
Drilling grout holes	25,600 lin. ft.
Concrete, Class A and B, piers, powerhouse, etc.	108,850 cu. yds.
Concrete, Class C, dam and mass pours	408,600 cu. yds.
Reinforcing steel for Class A and B concrete	5,411,800 lbs.

About 500 men will be employed by the contractors when operations are at a peak. Most of these are recruited from the neighboring communities. To provide housing for many of the key workers of the contractor's forces and the Government inspectors, the Corps of Engineers was forced to build 45 houses in Cartersville. This housing project, of individual homes averaging 5 to 6 rooms, was constructed with materials obtained mainly from surplus Army installations which were abandoned after the war.

National Constructors, Inc., is represented on the Allatoona Dam project by W. N. Evans, Project Manager; K. L. Parker, Chief Engineer; and A. D. Haile, Office Manager. Charles A. Jackson is Resident Engineer for the Corps of Engineers. Col. Mark M. Boatner, Jr., is District Engineer of the Mobile District which is supervising the construction. The District Office will also operate the dam when it is completed towards the close of 1949.

This contract does not include furnishing the generators and turbines which have been purchased under a Government-supply contract. The prime contractor will install the turbines, however. Through a subcontract to Mechanical Contractors & Engineers, Inc., of Atlanta, Ga., the contractor will install all mechanical, piping, and electrical work in the dam and powerhouse.

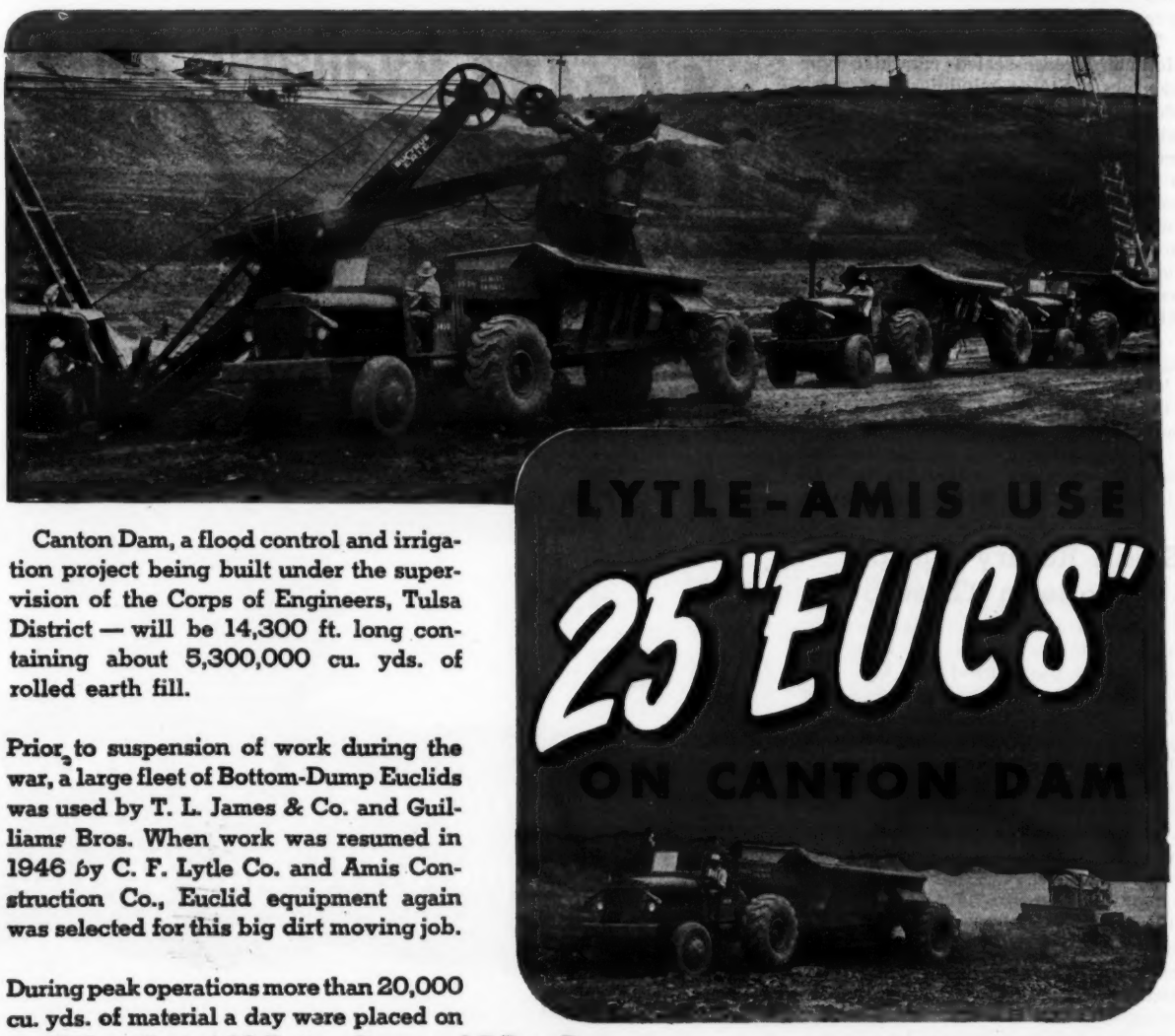


U. S. E. D. Photo

To get the proper circular outline for the cofferdam cells, a double-deck circular timber template was first spotted in place and secured. The sheeting was then driven and locked in place around this form.

Goodyear Advances Davis

The appointment of Claude E. Davis as Field Engineer in the middle west has been announced by the Mechanical Goods Division of Goodyear Tire & Rubber Co. This is a new post in Goodyear's field organization. Mr. Davis will assist mechanical-goods field representatives in obtaining technical on-the-job data, supervising the installation of conveyor belts, etc.



Canton Dam, a flood control and irrigation project being built under the supervision of the Corps of Engineers, Tulsa District — will be 14,300 ft. long containing about 5,300,000 cu. yds. of rolled earth fill.

Prior to suspension of work during the war, a large fleet of Bottom-Dump Euclids was used by T. L. James & Co. and Guilliams Bros. When work was resumed in 1946 by C. F. Lytle Co. and Amis Construction Co., Euclid equipment again was selected for this big dirt moving job.

During peak operations more than 20,000 cu. yds. of material a day ware placed on the fill by a fleet of 20 Bottom-Dump and 5 Rear-Dump Euclids. Material ranging from blow sand to hard red clay was loaded by two 2½ yd. shovels, two 1½ yd. draglines and a Euclid Loader. Hauls varied from 3,300 to 8,000 feet in length.

Reliable performance and the ability of the Euclids to stay on the job day after day, working two ten-hour shifts much of the time, enabled the contractors to keep well ahead of their earth moving schedule. Your Euclid Distributor or Representative will be glad to show you why Euclid off-the-highway equipment is the choice of many leading contractors and industrial users.

A Euclid Loader working with Bottom-Dumps averaged 525 cu. yds. hourly production despite delays caused by lack of sufficient hauling units.

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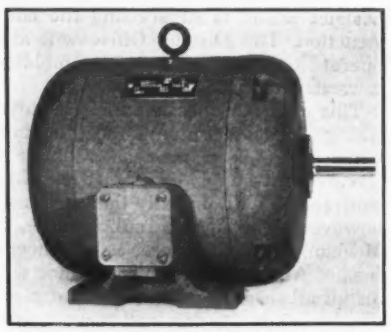

The new 3-phase squirrel-cage motor made by Kato Engineering Co. is totally enclosed and comes in three sizes—1½, 2, and 3 horsepower.

Squirrel-Cage Motor Made in Three Sizes

A totally enclosed motor is made in three sizes by the Kato Engineering Co., 4 Elm St., Mankato, Minn. These 3-phase motors come in sizes of 1½, 2, and 3 hp. They feature a squirrel-cage rotor made of rolled sheet-copper bars, said to produce uniformity and low internal rotor resistance.

The rotor is equipped with Norma-Hoffman grease-sealed cartridge-type bearings. Stator windings are completely submerged in varnish, and each winding is twice baked at moderate temperature to cure the varnish. Holes in the mounting feet are spaced in accordance with N. E. M. A. A special cast-iron outlet box threaded for the proper size of conduit is mounted on the side of each motor. Frame and end-bells are of cast iron and are equipped with a lifting ring.

According to the manufacturer, average readings on tests of many of the 1½-hp motors were: amps, 2.6; volts, 440; power factor, 67 per cent; foot-pounds, 6.9; cycles, 60; and rpm, 1,160.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 30.

Small Rotary Scraper Made in Three Sizes

A small tractor-drawn rotary scraper made in three models has been announced by the Central Mfg. Co., 4924 Poppleton St., Omaha 6, Nebr. The Model No. 424 is 4 feet wide and holds ½ cubic yard of dirt. The width of Model No. 524 is 5 feet and it has a ¾-yard capacity. The Model No. 630 is 6 feet wide, with a 1¼-yard capacity. The K-S scraper can be used for loading, dumping, spreading, or bulldozing.

All operations are handled by the tractor driver by means of trip ropes. The scraping blade is 6 inches wide, and is made of high-grade steel. It is removable for sharpening. The tractor hitch is designed to attach to most makes of wheel tractors.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 25.

Hydraulic Presses Serve For Many Shop Operations

A catalog describing its line of universal hydraulic presses for pulling, pressing, and jacking has been put out by Rodgers Hydraulic Inc., 7415 Walker St., St. Louis Park, Minneapolis 16, Minn. This 12-page catalog describes both the portable and stationary models.

Form No. 216 contains photographs of the Rodgers units in many job applications: pulling gears from shafts, straightening shafts, pushing the shaft from the spider gear of a diesel-powered shovel, removing the bevel drive gear from a road roller, pulling the sprockets from track-type tractors, jacking concrete pipe under railroad tracks, etc.

In addition, the catalog shows the outstanding features claimed for the various jacks in the line, the component parts of the units, and the hydraulic hand pump.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 69.

Va. Adopts Bridge Marker

A new type of marker for use on bridge approaches has been tested and found successful by highway officials of Virginia. The markers were placed several months ago on bridges which had a high accident frequency. Since that time no accidents have occurred, and the Department will place the new marker on all bridges in the state that have similar troubles.

The marker consists of two diagonally striped boards about 3 x 6 feet, placed at an angle of 30 degrees from each end post of the bridge.

Virginia has also adopted a new road-edge delineator. Instead of the standard all-white post which has been used in the past, the new markers will have the top 6 inches painted black for contrast, and will have reflector buttons.

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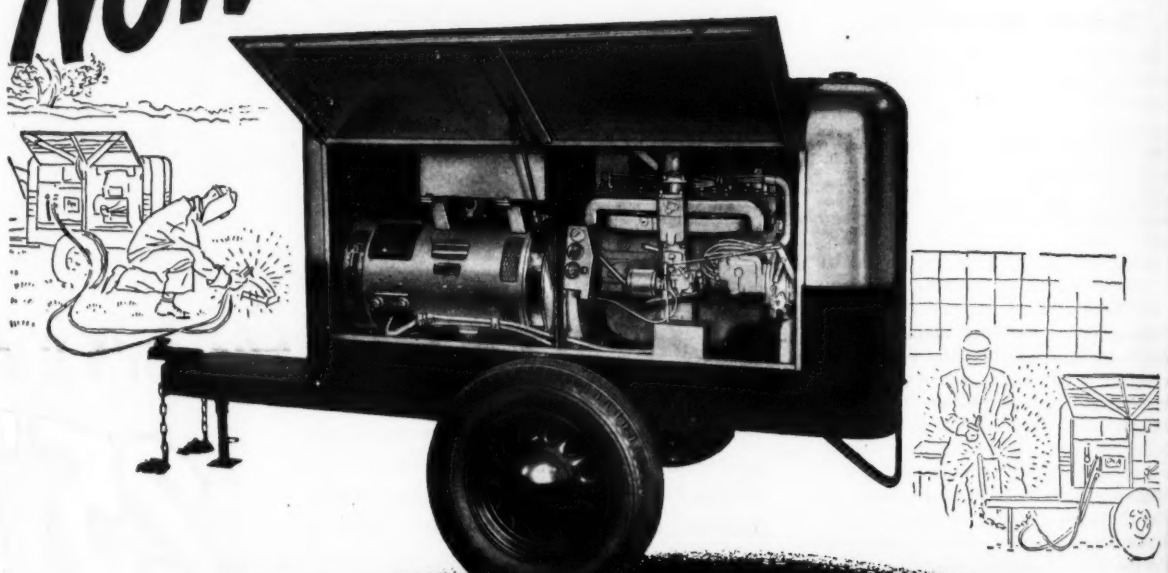

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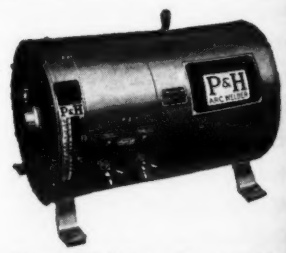
Price Complete Only $1,133.75!

This big, all-purpose welder costs little for the protection it affords against lengthy machine and equipment layups. Often pays for itself in a few jobs by keeping men and machines working. If desired, can be had as four-wheel trailer unit. See your nearest P&H distributor for full information or write for Bulletin W32-5.

Stationary Model

The P&H WN-300 Welder can also be had without trailer as a stationary model for $950.00. Perfect for truck mounting. Has convenient lifting hook for crane handling.



Bare Welding Generator

If you prefer to build your own portable welder, you can order the WG-300 generator alone. Has same big capacity, same ease of welding. Simple to hook up to your own engine. Price only $325.00. Ask for Bulletin W33-3.

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New Road Blasted Up Above Busy RR

Normally Tough Rock Job Becomes Doubly So When Shooting Is Right Above Great Northern RR Tracks

THREE hundred feet up above the Great Northern railroad tracks a puff of white smoke blooms against the green gorge wall of the Flathead River. A great chunk of rock rises briefly into the air, disintegrates, moves out to the edge of a 15-foot pioneer berm. One or two rock fragments roll down the mountain, gain speed, and smash in a cloud of dust against protective boards on the railroad tracks.

But all is clear in a few minutes. The main rock chunk, about 750 cubic yards, lies high up above the railroad, on the very edge of the berm, ready to be loaded out by power shovels. To the casual spectator it seems as if just one more pound of powder would have moved the mountainside down onto the tracks.

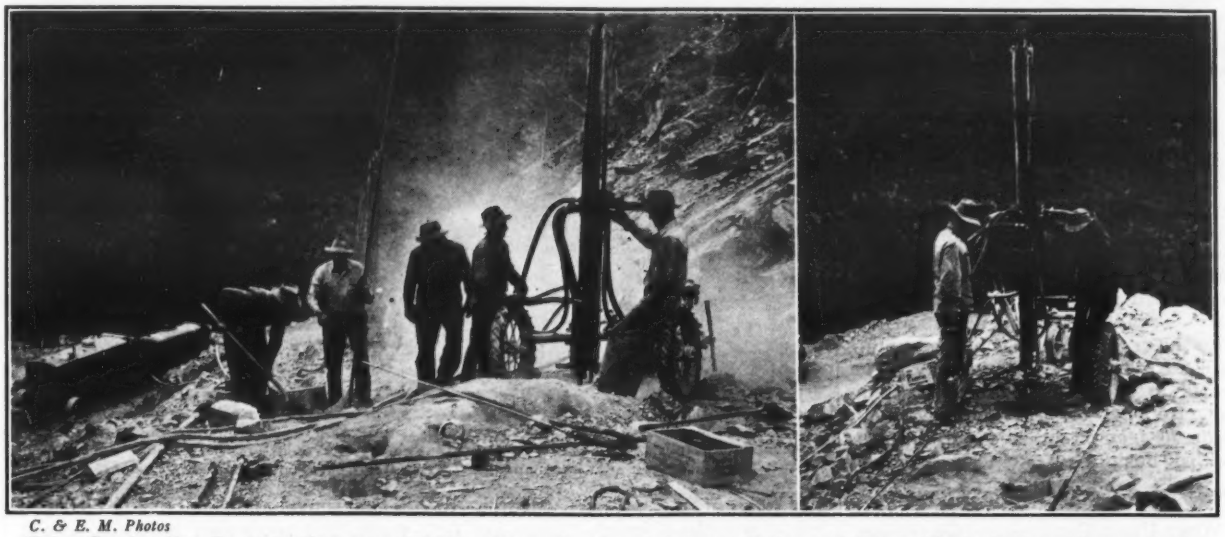
That scene typifies each day's work of the Union Construction Co. of Great Falls, Mont. For Union is currently working against time between Belton and Nyack, Mont. It is shooting and moving some 738,950 cubic yards of rock, mostly solid, for the Montana State Highway Commission, to relocate and modernize U. S. No. 2 around the south rim of Glacier National Park. Union's $730,941 contract includes all heavy grading, ditching, and a 4-inch bit-run blanket of select sub-base.

"Toughest Job in Montana"

Montana State Highway Department engineers say the Belton-Nyack job is the toughest ever attempted in Montana, and they might justifiably broaden that statement to apply outside the borders of the third largest state in the nation. For not only is the Belton job in its own right a tough one to drill and shoot, but about 4¼ miles of the 6.08-mile contract lies directly above the Great Northern railroad tracks. The least miscue on powder work would mean wrecked railroad tracks, knocked-down telegraph wires, and broken signals.

It is a tribute to the skill of crews working under the personal direction of H. H. "Slim" Tomlinson, owner of the Union Construction Co., that the amount of rock which fell on the railroad tracks has not been serious.

(Continued on next page)



C. & E. M. Photos

Union Construction Co. is moving some 738,950 cubic yards of rock between Belton and Nyack, Mont. Left, powdermen load a hole with Pacific 40 per cent gelatin; a Gardner-Denver wagon drill, at the right, sinks a 3-inch hole.

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New Road Blasted

(Continued from preceding page)

For the railroad, like the highway, winds up along the middle fork of the Flathead River at the southern boundary of Glacier National Park. It is the only place in that spectacular, precipitous mountain country where men dare build pathways. Centuries ago, the rock tilted up crazily at an angle. To carve a roadway now, men have to drill lifter holes angling in against the mountainside. That is the surest way in the world to bring tons of rock crashing out. But that rock must not move more than 20 feet on an average. It is a ticklish business.

New Road Meets Modern Design

When Union Construction Co. finishes the 6.08-mile stretch by the time snow flies this November, it will have built, in slightly more than a year, a modern, fast thoroughfare through some of the worst mountainous country in the nation. The new road has 17 curves in the 6.08 miles, ranging from 3 to 11 degrees. Maximum grade is 6 per cent. The roadway will be 37.11 feet wide, the sub-base course 32 feet wide, and a future contract will provide for a 26-foot bituminous wearing surface.

The new road is almost all on new location, except where it crosses the old highway. Tomlinson tried to keep the old highway open to let automobiles through. Later, he tried to let them through at night. But traffic in the summer near Glacier is as heavy as Tomlinson's blasting. With the road closed, better progress was possible.

Financed in part with Federal-Aid funds, the new road is designed to meet the high standards for modern thoroughfares of its type.

Some Problems Described

Consider some of the enormous practical difficulties. Bid in at an unclassified-excavation price of 82.5 cents per cubic yard, fully 90 per cent of the total quantity had to be shot out by explosives. With a limit of about 1½ miles of track over which the Great Northern Railroad was willing to issue slow orders to its trains, it was impossible to open up any more than that. In other words, the highway had to be finished as the work progressed.

Tricky bedded planes of quartzite and shale crashed in on the cuts, causing an increase of about 20 per cent over the in-place solid quantities, and making extra work necessary on the slopes.

Pioneer roads so steep that Caterpillar-mounted Angledozers crawled and fought their way up were the rule. They gave way in their turn to terrain so steep that wagon drills were let down by ropes wound around a steel drill anchored in the rock above.

Work Starts at East End

Work began September 9, 1946, at the east end of the project. Medium to heavy growths of brush, spruce, and fir trees were sawed down by a labor crew, and the smaller trees rooted out where possible by a grubbing blade on a Caterpillar D8.

C. & E. M. Photo

A puff of smoke blooms against the green gorge wall of Flathead River as another blast explodes on the U. S. 2 grading job around the south rim of Glacier National Park, Montana. Engineers say it's the toughest job ever attempted in that state, for it is 90 per cent rock and most of it lies above busy railroad tracks.

One shovel and some drills started to work, and succeeded in mucking out the better part of one of the heavy cuts at the east end. However, snow started falling on October 17, and soon the Great Northern tracks were covered 2 feet deep. Tomlinson kept his men on a stand-by status until about November 1, but the snow became more and more severe and finally set in with a vengeance. It took about two weeks of hard work to get the equipment out.

Last spring, as soon as the snow cleared off, Tomlinson returned with 35 pieces of heavy equipment, and started in to push the job as rapidly as possible. Portable air compressors, a big Gardner-Denver 500-cfm machine, two Gardner-Denver 350's, an Ingersoll-Rand 315, a Jaeger 210, and a Schramm 350 were moved up. Four Gardner-Denver wagon drills, plus a Cleveland and an Ingersoll-Rand wagon drill drew the heavy-drilling assignment. Pioneer and top drilling went to a dozen assorted hand drills, operated off the big compressor fleet.

The drills have consistently turned in good performance. Using 2½ to 3-inch-diameter Timken detachable rock bits, the wagon drills are boring about 150 linear feet of hole for each drill each

(Continued on next page)

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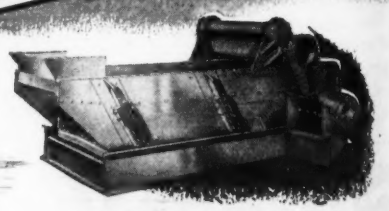
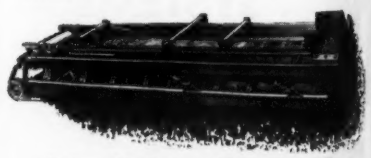


Cedarapids Horizontal Vibrating Screens give you more action, more uniform vibration, more efficiency, more capacity, more accessibility and more constant operation. Sizes from 2' x 8' to 4' x 12' in single and double decks.



Cedarapids-Symons Horizontal Vibrating Screens are specially suited for asphalt plants because they can be completely enclosed with the vibrating mechanism out of the heat and dust zone. Sizes from 2' x 6' to 4' x 12' in single, double and triple decks.

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Hayward Buckets

-hour shift they work. The jack-hammers are also using large-size bits, from 2¼ to 2⅝-inch, the purpose being o permit rapid loading of 2-inch gela-in cartridges. Wagon-drill holes are inking down on 6-foot centers, with -foot centers on jackhammer work. Steel 22 feet long is about the maximum ize. A 22-foot hole will take 17 of the -inch-long sticks of Pacific 40 per cent elatin if the hole is a "lifter"; about 23 ticks if the hole is straight down. No pringing is done on the job.

The rock is mostly a heavy shale, with ome quartzite and argillite present. The quartzite is toughest to drill, and its seldom last longer than a steel hange. They are sent away to be re-harpened.

Jackhammer men working from a afety rope sometimes start the top of he cut. These holes are put down traight, and jackhammer operators get rom 50 to 75 feet per drill in 8 hours. Two of the Gardner-Denver wagon drills have successfully kept a 2-yard Northwest shovel busy all summer.

Because the shooting is so ticklish, he powdermen supervise the drilling of oles as much as possible; then they oad the powder. Ordinary blasts con-ain about 500 pounds of powder, and bring down from 750 to 1,000 cubic ards of rock. The powdermen remove he paper from the cartridges of gelatin, ith the exception of the stick which ontains a No. 6 electric blasting cap. The gelatin seems to tamp in better ith the paper removed, and the bigger artridges permit faster loading.

Charges are touched off after elabo-ate safety precautions. Blasts are sually exploded well ahead of any rain schedules, so if the worst happens, ection crews can repair the tracks. One

C. & E. M. Photo
With the Belton-Nyack job strung out along the mountain in the back, this Lorain shovel dumps a dipperful of blasted rock into a truck.

of the toughest breaks of all happened earlier this year. The blast was practically perfect. But one huge boulder broke loose high up on the backslope, rolled down the mountain with express-train speed, and tore three rails off the railroad track. However, section crews have spare rails scattered near-by for just such a catastrophe, and the damage was quickly repaired.

The most successful technique—one now being followed—consists of keeping three or four of the biggest rocks handy around the shovel. When a blast is ready to be set off, these big rocks are pushed out to the edge of the berm. They serve to catch the toe of the blast and hold it at that point, preventing tons of stone from going off the edge. If the weight of the rock causes these big stones to teeter over the edge, a Caterpillar D6 tractor with a Kay-Brunner bulldozer blade and a Caterpillar winch retrieves them with the aid of a cable sling.

When this magazine's Western Editor visited the project, a successful and interesting shot was pulled. The lifter holes had been sunk in 18 feet, and there was 19 feet of berm where the first pioneering had been done. When the shot was fired, the rock rose up almost imperceptibly, the toe slid out and stopped at the edge, and only three stones of about 500 pounds each rolled down on the tracks. But the ties and rails were protected by 3 x 8 timber boards laid out in front of the shot, and there was no damage whatever as a result.

Loading and Hauling

Three separate drilling crews, spaced within 1½ miles, are busy. Each has its drilling and shovel equipment. Tomlinson uses a 2½-cubic-yard Northwest, a 2-yard Northwest, and a ¾-yard Lorain, with 3 end-dump Euclids, 2 bottom-dump Euclids, and 4 International 8-cubic-yard dump trucks. Quite a bit of the rock must be hauled ¾ mile to fit in to the balanced fills.

Loading large rock out to these units is a rough and bruising business, but

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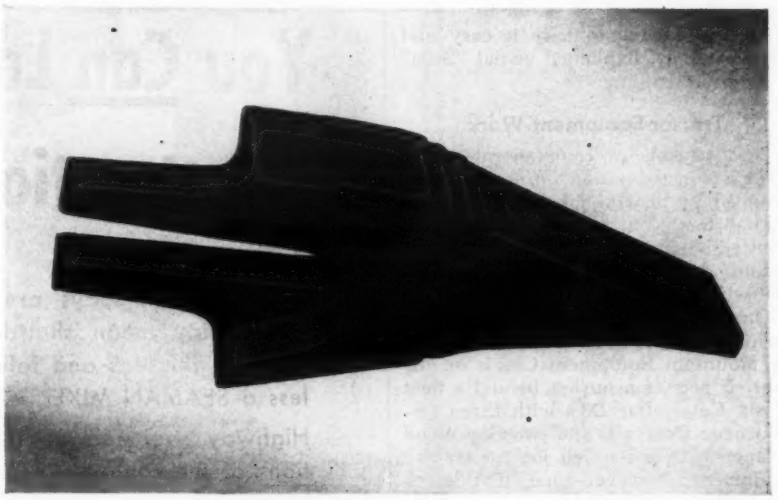
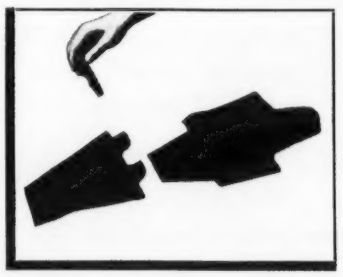


Faster Digging with *ESCO* Box Points and Adapters



Box-type point fits perfectly to adapter; is locked to adapter by alloy steel pin, which is held in place by rubber keeper.

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C. & E. M. Photo
General Superintendent Ray F. Hollern, left, and H. H. Tomlinson, President of the Union Construction Co., face the camera with a Northwest 80-D in the background.

New Road Blasted

(Continued from preceding page)

the shovels and the hauling units are standing up remarkably well, according to Mr. Tomlinson. Where the rocks are left too big to load with any of the dippers, secondary drilling and shooting has to be done. The job has not been one for spectacular speed, especially in the heavy rock.

"We just have to take it easy and keep after it," explained genial "Slim" Tomlinson, smiling.

Tractor-Equipment Work

Two pockets of conglomerate, with slight cementation present, have cropped up in the job. Tomlinson is taking them out with tractor equipment; in some cases he is also moving a limited amount of short-haul material which was drilled and shot.

One of the Allis-Chalmers HD-14C torque-converter tractors distributed by Mountain Equipment Co., is on the job. It acts as a pusher behind a fleet of six Caterpillar D8's with three LeTourneau Carryalls and two Gar Wood scrapers. It is a tough job for tractor equipment, however—one that gives the machines bruising wear every one of the 8 hours they work.

Because the Great Northern Railroad stipulated that no active excavation could be done at night, excavation operations are conducted only one shift. The only work under lights at night is the drilling.

Because of the stipulation which governs the length which may be opened up at one time, Tomlinson finds it impossible to work on one particularly heavy cut which he says he should have been in three months before the job's completion date. Some of the cuts are 160 feet deep on the vertical distance. It is a tough job to finish progressively.

Two borrow pits, provided by the State, are furnishing the 4-inch blanket of sub-base. The material is trucked in, dumped, spread by a bulldozer, and dressed by a motor grader.

Slopes May Slough

Considerable sloughing of the broken edges of the shaly slopes is expected as a result of winter freezes for a few years. But this is one of those things, the price of building this highway. Tomlinson's men are risking life and limb on the end of safety ropes high up on some of the slopes, scaling off the loose rocks with crowbars. Freezing and thawing will probably finish what they have started.

Personnel

The job is being done under the general direction of Ray Kuhns, Construction Engineer, Montana Highway Commission, operating through Myron Lockey, District Engineer. Tom Ratchford is Resident Engineer. For the contractor, Ray F. Hollern is General Superintendent under Slim Tomlinson, J. W. Merz is in charge of rock excavation, Earl McDonald is Master Mechanic on power shovels, and K. K. McDonald is Office Manager.

Completion of the Belton-Nyack highway will also be a monument, in a sense, to Al Winkler of Kalispell, Chairman of the Montana State Highway Commission, who has labored hard and diligently to improve the highway system of his state. Much of the present development of northwestern Montana has been Al Winkler's doing, and each shot in the Union Construction Co. contract is another step forward in the State's progressive highway program.

Link-Belt Staff Changes

Three changes in its sales-management personnel have been made by the Link-Belt Co. of Chicago. James B. Elliott has been appointed Divisional Sales Manager at the company's plant in Minneapolis. Erwin A. Wendell has been named Divisional Sales Manager for products of the Caldwell plant. T. W. Matchett has been named District Sales Manager of the Chicago branch of the company.

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Phone BArclay 7-9793

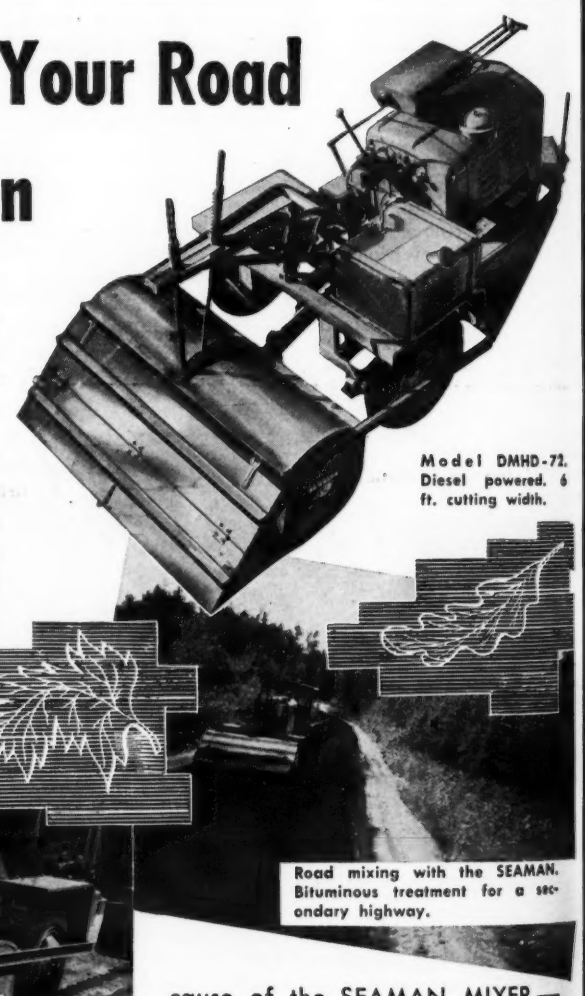
You Can Lengthen Your Road Construction Season

Nippy autumn days are upon us, — days which may mean shut-downs because the road oil thickens and refuses to mix, — unless a SEAMAN MIXER is on the job.

Highway engineers up in the northern sections of the country where at best the road-building season is short, first discovered the SEAMAN produces a highly successful, uniform bituminous mix, with excellent control of voids, in temperatures as low as 35 degrees.

A Wisconsin county highway commissioner reports that his crews put in 30 **extra** days of work because of the SEAMAN MIXER,— 30 days which otherwise would have been lost due to cold weather; a whole month as a SEAMAN bonus.

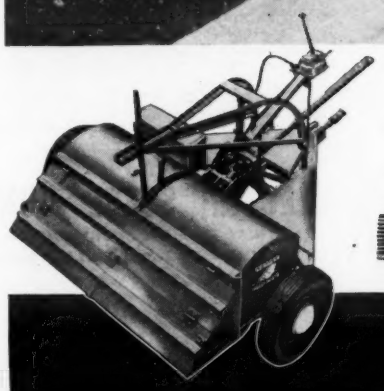
So wherever low temperatures may be a factor,—get a SEAMAN and add **days** to your road building season.



Model DMHD-72. Diesel powered. 6 ft. cutting width.

Road mixing with the SEAMAN. Bituminous treatment for a secondary highway.

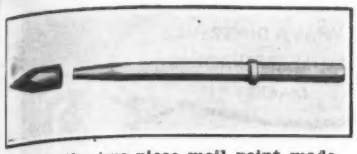
Mixing next to curb on a city street with the SEAMAN.



Model THD-48 SEAMAN MIXER. Operated by tractor power take-off. 4 ft. cutting width. Prices start as low as $869.00.

Constant revisions by Seaman engineers have kept this widely popular, highly practical book, "Soil Stabilization Methods", up to the minute in modern practices. Write for your copy. Ask for Bulletin E-25.

SEAMAN MOTORS, INC.
MILWAUKEE 3, WISCONSIN



Here is the two-piece moil point made by Rockbit Sales & Service Co., showing the replaceable tip.

Two-Piece Moil Point

A moil point with a replaceable tip has been developed by the Rockbit Sales & Service Co., 2514 E. Cumberland St., Philadelphia 25, Pa. The shank of this point is said to be built of a tough steel for long life, while the steel for the point has been selected for its cutting ability. The point is held to the shank by a friction grip.

As the cutting edge wears down, the tip can readily be replaced. Worn points may be resharpened. On a recent test, according to the manufacturer, a point broke up 32 square yards of 14-inch concrete pavement on one regrinding.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 29.

Rear-End Dirt Scoop

A rear-end dirt scoop for use with most rubber-tired tractors is available from the General Welding Co., 30th & So. Broadway, Wichita, Kans. It has an 11-foot capacity, and will carry, spread, fill, or dump. When locked in a vertical position, it can also be used as a bulldozer. With a replaceable self-sharpening cutting edge, the scoop will fill in from 4 to 30 feet of travel, depending on soil conditions, it is said.

Height of the Terra-Scoop is 30 inches; depth, 26 inches; and width is 44 inches. Power is obtained from the tractor's hydraulic system. Attachments are available for using it with John Deere A and B tractors, Case VA, VaC, and VAI models, Farmall M and H, Ford tractors, and others.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 24.

Illinois Branch Opened

A Rock Island, Ill., branch office has been opened by the Chicago Pneumatic Tool Co. of New York City. Located at 528 Eleventh St., it will be under the jurisdiction of the Chicago district office.

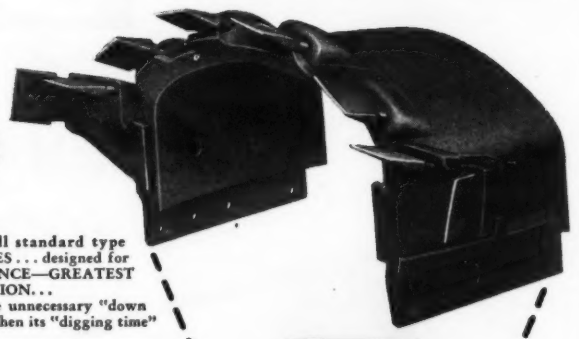
Tandem Roller Features Single-Lever Steering

A 6-page 2-color folder describing the Wheeler 3 to 4-ton tandem roller has been issued by the Shaw Sales & Service Co., 5100 Anaheim-Telegraph Road, Los Angeles 22, Calif. Included with the folder is a bulletin telling the story of the Wheeler single-lever hydraulic steering and electric starter.

One page of the announcement is devoted to a description of fifteen outstanding features claimed for the unit; another page contains a list of specifications; others contain photographs and text describing and showing the Wheeler roller's ability to hug curbs or walls for close-up finishing, the single-lever clutch and shift for forward and reverse travel, and other features.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 51.

There's DIGGING POWER in a Jiffy



JIFFY BUCKETS for all standard type TRENCHING MACHINES . . . designed for MAXIMUM PERFORMANCE—GREATEST ECONOMY OF OPERATION. . .
. . . designed to eliminate unnecessary "down time" of your machines when its "digging time" that counts.

JIFFY BUCKETS. . .
- Eliminate the necessity of carrying in stock a different rooter for each type of machine.
- Eliminate unnecessary bolt-holes which tend to weaken bucket construction.
- Eliminate wasted "down time" required for removing and sharpening ordinary points. A complete set of JIFFY QUICK CHANGE, SELF-SHARPENING POINTS may be reversed or changed in a matter of minutes, and the cost of a complete set of JIFFY POINTS is less than the cost of removing and sharpening a set of ordinary points.

JIFFY QUICK CHANGE REVERSIBLE POINTS ARE INSERTED WITHOUT THE USE OF BOLTS, WEDGES, OR CRIMPING. THE TAP OF A HAMMER WILL INSTALL OR REMOVE A JIFFY POINT

JIFFY ADAPTERS are available for all standard types of buckets.

SELF SHARPENING
QUICK CHANGE
FAST

Jiffy Products Company
Phone Taylor 9567
4325 Elm Street Dallas, Texas

Look to MC FOR THE BEST IN EQUIPMENT

MIXERS
2 WHEEL—4 WHEEL

JETCRETE GUNS

PUMPS
CENTRIFUGAL
DIAPHRAGM AND HIGH PRESSURE

Unit for unit—Feature for feature—Dollar for dollar—You can depend upon CMC Equipment to render "TOP" performance. See Your CMC Distributor, today, or write for catalog. Get the full details—then decide.

CONSTRUCTION MACHINERY CO'S.
WATERLOO, IOWA

Soon it will be like this—

GET READY WITH A GLEDHILL SNOW PLOW!

Insert shows standard plow with under-truck mounting. No holes to bore—hook bolts clamp over main truck frame. Crimped moldboard keeps snow light, aerated and fast flowing.

Send for detailed bulletin!

AVAILABLE THROUGH DISTRIBUTORS ACROSS THE NATION

GLEDHILL ROAD MACHINERY CO. Galion, Ohio

J. W. Stang Wellpoint System
FOR SALE

Consisting of Wellpoint Pump, Jetting Pump with 300' 6" Header Pipe—130 Swing Joints, 125 Wellpoints, 1½" pipe, valves, etc. Almost new. Will sacrifice for quick sale.

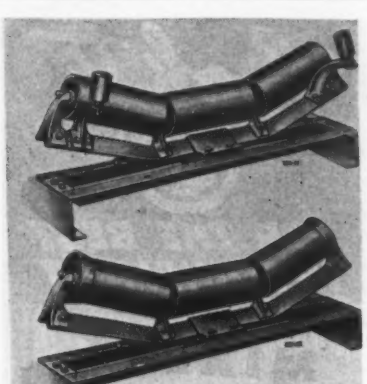
Watkins-Aldridge Equipment Co.
Jackson, Mississippi

Keep On

BUYING BONDS

★ ★ ★ ★

DON'T SKIMP!



Included in the belt-conveyor line of Jeffrey Mfg. Co. are positive-type self-aligning idlers with guide rollers, and self-aligning idlers with flared, friction-type end pulleys adaptable for reversible belts.

Self-Aligning Idlers For Belt Conveyors

Improved self-aligning idlers with guide rollers and self-aligning idlers with flared, friction-type end pulleys adaptable for reversible belts have been added to its line of belt-conveyor equipment by the Jeffrey Mfg. Co., 970-99 No. 4th St., Columbus 16, Ohio.

Complete data on belt idlers and belt conveyor practice are contained in Jeffrey's new 160-page catalog No. 785. It features data on standardized units for easy selection of belt conveyors. In addition, it includes tables, formulae, and other data for determining horsepower, capacities, speeds, and other design factors.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 74.

Built-Up Mixer Drum Has Removable Staves

A concrete mixer for use in central-mix or large-production concrete plants is made by the Dodson Mfg. Co., 1463 Barwise, Wichita 2, Kans. Feature of the mixer is a specially designed drum built up from individual staves. These staves can be replaced as wear occurs without the necessity for a complete drum replacement.

The Dodson-McCord Bowl-Less mixer is made in 11, 18, 28, 42 and 54-cubic-foot sizes. It can be used for standard or air-entrained concrete. The specially designed staves are concave-shaped and bolt to the drum ends to form the mixing drum. The sides of the staves are uniformly beveled to provide a tightly sealed fit. Bolted segment lugs in the middle of the staves are said to eliminate deflection under mixing pressure. The staves are held in place by six bolts, and each can be removed without disturbing the other staves.

According to the manufacturer, the spiral mixing blades are set to enter the aggregate easily and mix it thoroughly. The mixed aggregate flows to the center of the drum, where the discharge gate is located. The gate control handle is on the operator's side of the machine.

The mixer blade shaft is rotated through a pulley and flat or V belts, or by built-in reduction gear. A clutch is available as an extra feature. Bearings on the blade and jack shaft are said to be self-aligning, dustproof, and permanently sealed.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 36.

Supplies and Equipment For Surveyors, Draftsmen

The 6th edition of its complete catalog of drawing materials and surveying instruments is now available from the B. K. Elliott Co., 126 Sixth St., Pittsburgh, Pa. This book style catalog contains over 400 pages.

Drawing papers and cloths, drawing instruments, transits and levels, T-squares and irregular curves, planimeters, pantagraphs, slide rules, blueprint machines, tracing tables, drawing boards, plumb bobs, scientific books, pencils and erasers, and many other items are listed and illustrated in the catalog.

Included with it are samples of some of the tracing and drawing papers available. And an index for handy reference helps make this book a valuable aid to engineers and draftsmen.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 70.

Eastern Factory for Esco

The establishment of an eastern manufacturing plant at Danville, Ill., has been announced by the Electric Steel Foundry, of Portland, Oreg. The plant, under the supervision of Vincent J. Shanahan, will produce Esco dragline buckets and dippers.

WHAT A DIFFERENCE
A LITTLE REBUILDING
MAKES !
REBUILD SHOVEL AND DIPPER TEETH
MANGANAL
(Trade Mark Reg. U.S. Pat. Off.)
11% to 13½% MANGANESE NICKEL STEEL
WEDGE BARS
Repointing teeth with MANGANAL is a lot cheaper than replacing equipment. And these wedges take impact and abrasion better than new Manganese Steel teeth! Easy to attach by welding with Manganal Bare or Special Tite-Kote Welding Electrodes. For super-duper wear, use an overlay of Seaco.
NAME OF N EAREST DISTRIBUTOR UPON REQUEST
FREE FOR THE ASKING! Our Booklet "The Welding of 11% to 14% Manganese Steel."
STULZ-SICKLES CO.
Sole Producers
91 N. J. Railroad Avenue, NEWARK N J

CHOSEN TO POWER THE WORLD'S LARGEST, MOST POWERFUL TRACTOR
Brute strength and velvet control are combined in the new Allis-Chalmers HD19 40,000 lb. torque converter tractor, powered by a 6-cylinder General Motors 2-cycle Diesel engine.
—the General Motors Diesel Engine
The new Allis-Chalmers HD19 tractor with hydraulic torque converter is powered by a General Motors Series 71 2-cycle Diesel engine.
To quote Allis-Chalmers, this new, mighty tractor was "built to get more work done—built to last longer with less upkeep." The GM Diesel with its wealth of smooth dependable power will do its full share in making good on both points.
Allis-Chalmers' selection of the GM Series 71 engine for the world's largest, most powerful tractor is in line with the thinking of more and more builders of shovels, cranes, soil stabilizers, pumps, air compressors, ditchers, dirt wagons and other heavy road-building and contractors' machinery.
The GM Diesel engine is the logical choice where quality of manufacture and PERFORMANCE count.
DETROIT DIESEL ENGINE DIVISION
DETROIT 28, MICH. • SINGLE ENGINES .. Up to 200 H. P. MULTIPLE UNITS .. Up to 800 H. P.
GENERAL MOTORS
DIESEL BRAWN WITHOUT THE BULK
GM GENERAL MOTORS DIESEL POWER

Delayed Highway Job Paved With Concrete

New Location Graded Prior To War Is Completed Six Years Later; Wet Loess Sub-Base Delays Work

WHILE the grading on Mississippi State Highway 3 between Satartia and Crupp was completed in 1941, the 8.87 miles of concrete pavement was finished only last spring. Beginning on the south at Satartia, the new 20-foot pavement in Yazoo County continues northwards, on practically all new location, to a point about 5 miles south of Yazoo City. The original contract, awarded by the Mississippi State Highway Department before the war, included only the heavy grading, bridges, and drainage structures. The grading was finished late in 1941. Since traffic could still use the existing 18-foot clay-gravel road, the new paving was deferred until well after the war was over when labor and materials had become more available.

A paving contract was awarded by the State Highway Department to the Burdine Construction Co. of Greenville, Miss., on its low bid of $329,389.12, and work on the highway was resumed in September, 1946. Besides the 6-inch plain-concrete pavement, the contract included some additional earth work in several places where slides had occurred on sidehill locations. In one place it was necessary to raise the grade 6 to 7 feet along a 1,000-foot stretch to secure a better foundation. Fresh roadbed topping also had to be added to the sub-base in some instances, and more drainage pipe was likewise installed.

The initial pre-war construction was done by the Ed Morgan Co. of Jackson, Miss. Besides the heavy grading, two good-size bridges were included in the contract. One 400-foot bridge over Perry Thompson Creek has eleven I-beam spans carrying a reinforced-concrete deck. Only the concrete piers were completed on the other structure which, when finished, will be a continuous-girder span of 459 feet. The structural-steel shortage long delayed construction of the superstructure; however, it is now nearing completion. When finished, it will carry the new highway over the tracks of the Yazoo & Mississippi Valley Railroad.

Grading Operations

Although the major grading was completed in the early contract, some 48,371 cubic yards of material still had to be moved before any pavement could be laid on the new highway. Some of this was occasioned by fill settlement; by a redesign of the profile to raise the grade; and by reason of the slides, necessitating the construction of new embankments.

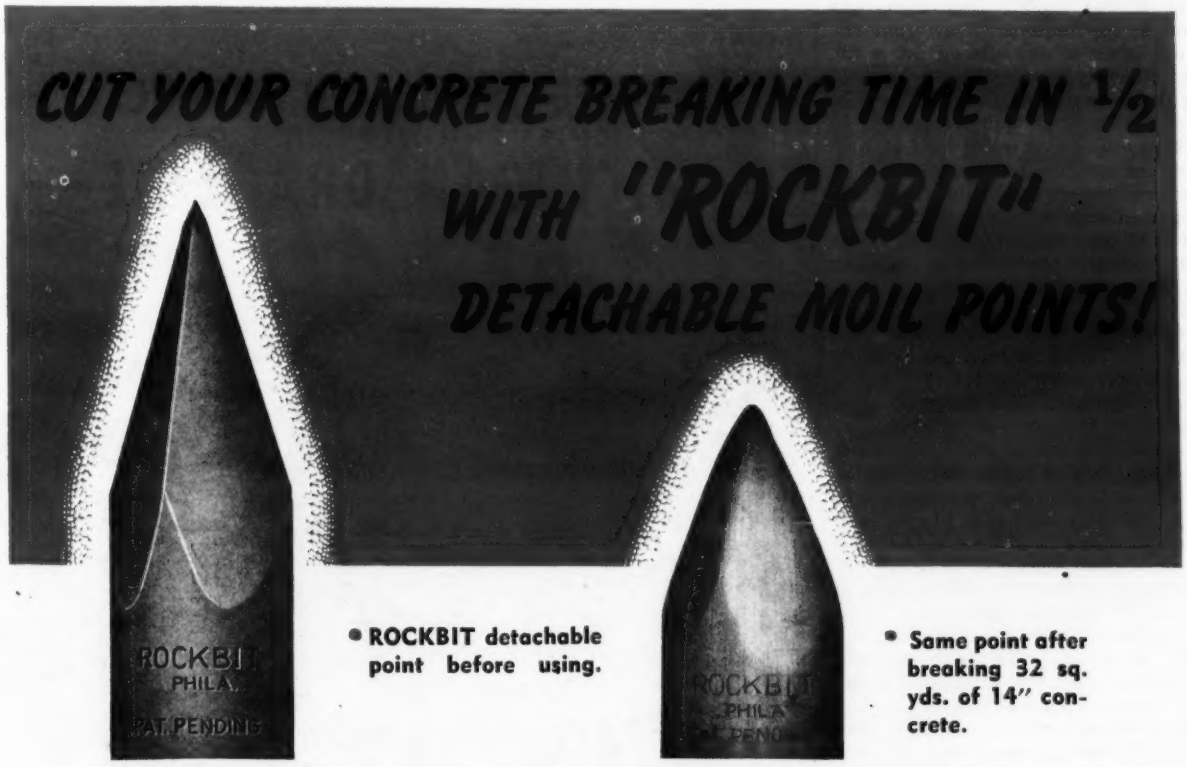
For the short hauls under 1,500 feet, the contractor moved the dirt with tractor-scraper units. They included two Bucyrus-Erie 9-yard scrapers pulled by International TD-18 tractors, and two LeTourneau 15-yard Carry-alls pulled by Caterpillar RD8's. A couple of other TD-18 tractors equipped with Bucyrus-Erie dozer blades spread the material in 6-inch layers. It was compacted by a Blaw-Knox sheepsfoot roller pulled by a TD-18 tractor.

(Continued on next page)

C. & E. M. Photo

At the Burdine Construction Co.'s aggregate batching plant, a Koehring 304 crane with a 45-foot boom and Blaw-Knox clamshell bucket stockpiles gravel beside the Blaw-Knox 100-ton aggregate bin. Sand is stockpiled on the other side.

CUT YOUR CONCRETE BREAKING TIME IN ½ WITH "ROCKBIT" DETACHABLE MOIL POINTS!



• ROCKBIT detachable point before using.

• Same point after breaking 32 sq. yds. of 14" concrete.

This remarkable record of 32 square yards' breakage with one regrind was made on a street project. The job called for breaking up 14-inch concrete and was one of a series of projects chosen as testing grounds for the sensational new ROCKBIT detachable point. Other tests have proved that ROCKBIT detachable points will stay sharp longer by more than 7 to 1 and break 50% more concrete per man hour. *No other point can match this record.*

Such records are the result of long research in the laboratory and on-the-job. The ROCKBIT detachable point is forged of two different types of steel instead of the usual one. "Tough" steel gives long life to the shank. "Hard" steel gives cutting ability to the point. When the point dulls it can be detached and a new point placed on the same shank, eliminating the need of many tools. The old point can be reground by any laborer. Old-fashioned blacksmith resharpening is eliminated.

DEALERS ATTENTION: Immediate delivery from stock on all "ROCKBIT" Pneumatic Accessory Tools. Write for complete catalog and price list.

Prove for yourself that ROCKBIT detachable points will cut your time and costs. If your distributor cannot supply you, write direct to our nearest plant.

ROCKBIT SALES & SERVICE CO.
2514 E. Cumberland Street, Philadelphia 25, Penna.
350 Depot Street, Asheville, N.C.

ROCKBIT
SALES AND SERVICE CO.

SYMONS SAFETY SHORES

with

- Patented Metal Scab
- Tee and Ell Heads
- Lifting Jack that Works Like Hydraulic
- Safety Wedge

Extension securely held by metal parts.

Extensions come in 4', 6', and 8' lengths allow shore to reach 25'.

Symons Safety Shores have been recognized for many years by builders as tops in the field. Symons Shores have earned this reputation because they possess those important features that go into the making of quality shores . . . light weight . . . easy to adjust . . . greater load capacity . . . steel forging holding cam . . . malleable castings. In addition they are priced right. Write for complete details and prices . . . also ask about our Forming System and Column Clamps.

For Rent and Sale

SYMONS CLAMP & MFG. CO.
4251 Diversey Ave., Chicago 39

Delayed Highway Job Paved With Concrete

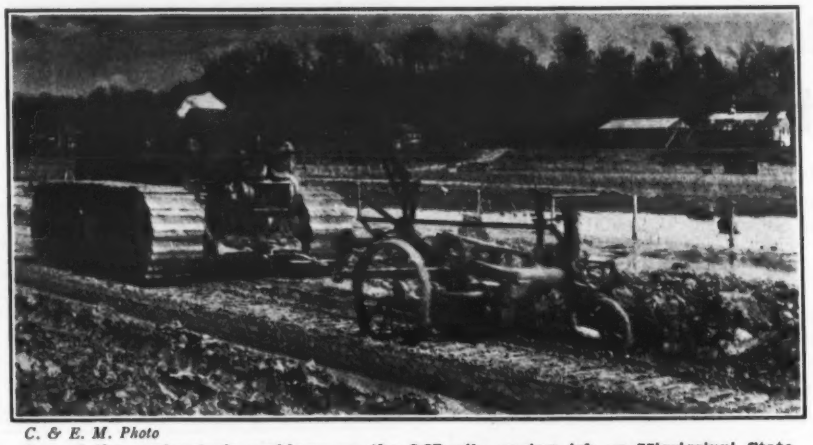
(Continued from preceding page)

For the longer hauls, where excess dirt had to be moved out of the slides, and also from a borrow pit which supplied fill and topping material, the dirt was excavated and moved by dragline and trucks. A Northwest 25 crane with a 40-foot boom and a Yaun ¾-yard shell-type bucket loaded the loess soil to a fleet of 12 Ford 1½-ton trucks with 4-yard dump bodies.

After the material was spread and compacted, it was shaped to grade by two Adams motor graders. In this west central section of the state only a few miles away from the Mississippi River, loess was the only type of roadbed-topping material available. The disadvantage to the contractor in its use was its characteristic of retaining moisture. The particular pit used, even when it was freshly excavated, was damp at the bottom. When rain occurred after it was placed on a fill, great difficulty was experienced in getting it dry enough so that the concrete pavement could be laid on top.

The specifications called for a 15-inch course of roadbed-topping material to be spread between the slope lines and compacted at an optimum moisture content of 15 per cent. After a rain, 27 per cent moisture content was common, and the removal of this excess wetness was a long slow process of aeration. The water-soaked base course was first plowed by 3-disk 30-inch-pan agricultural plows pulled by TD-18 tractors. Two of these units were generally used, breaking up the wet heavy soil in large chunks to a depth of about 18 inches. Following behind came two double-tandem disk harrows equipped with twelve 30-inch scalloped blades, also pulled by TD-18's. These cut up the soil into small pieces, turning it over continually so that it would dry out in the process. Then the graders reshaped the roadbed; if it was still too wet, the entire operation of plowing, harrowing, and grading was repeated until the desired moisture content was attained.

The finished roadbed is 30 feet wide for the 20-foot pavement and the two 5-foot shoulders which have a pitch of 1 inch to the foot. The slopes are either 2 to 1 or 3 to 1, depending on the height of the fill.



C. & E. M. Photo

One of the contractor's problems on the 8.87-mile paving job on Mississippi State Highway 3 was moisture. To aerate and dry out the wet loess, a 3-disk agricultural plow pulled by an International TD-18 tractor works the subgrade material.

Batch Plant

By last November the grading was sufficiently along so that concrete operations could begin. A concrete batch plant was set up at the town of Valley, about midway of the project. Sand and gravel were obtained from near-by pits on U. S. 49 in the vicinity of Yazoo City. The pits were owned by Peterman Bros., who also delivered the material 7 miles by truck to the batch plant. It was stockpiled alongside a Blaw-Knox 100-ton aggregate bin which was kept charged by a Koehring 304 crane with a 45-foot boom and a Blaw-Knox 1-yard clamshell bucket.

A few hundred feet farther along the old road, a Blaw-Knox 300-barrel cement-storage bin was set up near the Valley station siding of the Y & MV Railroad. Ideal bulk cement in hopper-bottom cars was shipped to this point from Mobile, Ala., over both the Gulf, Mobile & Ohio, and the Illinois Central railroads. It was there unloaded into a trough under the tracks, where a worm gear moved it along to an enclosed elevator which lifted the cement to the storage bin. A Jaeger 105-cfm portable air compressor, set up at the bottom of the bin, supplied air to aerate the cement within the bin, keeping it loose so that it would dump easily.

(Continued on next page)

CUMMER
ASPHALT PLANTS
EIGHT SIZES
Up to 1000 Tons per day
DRYERS
Two-Fire and Internal Fire
30 to 100 Tons per hour
Electric Batch Timers
50 Years' Experience
THE F. D. CUMMER & SON CO.
EAST 17th & EUCLID
CLEVELAND 15, OHIO

MERCED IRRIGATION DISTRICT
CHIEF ENGINEER SAYS OF
MICHIGAN DRAGLINE--

"Performance has been excellent"

"The MICHIGAN gives us the flexibility and mobility required in our operations. Even in the short time we have had this machine, we have found so many uses for it that we wonder how we got along without it before. Performance has been excellent and we are looking forward to years of efficient operation."

Wherever you go, you'll find users enthusiastic with praise of MICHIGAN performance, economy, operating ease and time-saving truck mobility. Talk to any MICHIGAN owner and you'll see why so many become "repeat" buyers. See your distributor for details on the entire MICHIGAN line.

MERCED IRRIGATION DISTRICT serves 164,000 acres of diversified croplands, maintains 723 miles of canals, over 5,700 structures, 50 miles of drainage channels, 106 drainage wells and a dam and hydroelectric plant on the Merced River.

MICHIGAN
MICHIGAN POWER SHOVEL COMPANY
500 SECOND STREET • BENTON HARBOR, MICHIGAN

Each of the 22 Ford trucks hauled two batches at a time. They first backed under the aggregate bin for the load of sand and gravel, and then drove under the cement bin for the loose-measurement cement, weighed out on a beam scale. A proportion of 1 : 1.78 : 3.46 was followed with the cement, sand, and gravel for the 8-bag batches. For each bag of cement in the mix 5½ gallons of water was added, or a total of 44 gallons to the dry weights which were as follows:

Cement	752 lbs.
Sand	1,523 lbs.
Gravel	2,899 lbs.

The gradation requirements of the coarse and fine aggregate were kept within these limits:

Sieve Size	Per Cent Retained	
	Gravel	Sand
1-inch	0-15	.....
½-inch	45-70	.....
No. 4	94-100	0-5
No. 8	.....	0-20
No. 16	99	10-50
No. 30	.....	30-70
No. 50	.....	70-97
No. 100	.....	95-100

Building the Road

When the sub-base was ready, form trenches were dug by a Carr form grader to receive the Blaw-Knox steel forms of which the job boasted 6,000 linear feet. These forms were set by hand, 20 feet apart, since paving operations were carried on for the full width. The Koehring 34-E Twinbatch paver worked between the forms, being supplied by the batch trucks which backed down the grade to it. Usually the trucks ran along the shoulder and then cut in to the grade through a gap made by leaving out a couple of 10-foot lengths of forms. The paver pulled along a Koehring subgrade planer which cut the grade down when necessary to accommodate the 6-inch uniform depth of slab with a 1-inch center crown. Surplus dirt was thrown off to one side by laborers with hand shovels. Behind the planer came a scratch board, with pins on 12-inch centers, as a final check before any of the concrete was placed.

Water for the mix was pumped from creeks on the job by a Rex 3-inch pump. Usually one pump was sufficient for the shorter distances, but in one instance when the pipe line stretched out 5 miles another similar pump was hooked up to the lines. The size of the iron pipe included 2, 2½, and 3-inch diameters. Batches were mixed ½ minute in each drum, or a total of one minute, before being run out on the 35-foot boom for spot-dumping on the sub-base.

Wooden expansion joints were set up every 120 feet along the new highway. They consist of two 10-foot lengths of soft wood, 1 inch thick and 5¼ inches deep, cut to the crown of the road, and set ¾ inch below the surface of the slab. Across the top a metal cap containing a wooden plug was slipped on, to be removed later by the finishers after the screeding machines had passed on. The joint was held in place by an 18 - gage - metal one-piece chair. Through holes in the wooden joint at the mid-slab depth, ¾-inch round dowels, 12 inches long, are spaced on 15-inch centers. At the ends the dowels were painted, greased, and enclosed in metal sleeves which permit movement for expansion or contraction.

A longitudinal joint down the center of the pavement, consisting of a ¼ x 2-inch premolded asphalt strip, was installed as the paving progressed. Across this center joint ½ x 30-inch deformed bars were inserted on 30-inch centers and supported on metal chairs. Contraction joints, ¼ inch wide x 2 inches deep, were cut into the concrete on 40-foot centers.

Concrete Equipment

As the concrete was dumped, it was leveled off by a Blaw-Knox gas-electric double-screed finisher on which was carried a Master vibrator for use at the joints and along the forms. This was followed by a Koehring Longitudinal Finisher, at the rear of which was a wheel for cutting the center-line joint, 3 inches deep and ⅜ inch wide. The cut was filled in at once with the strips of felt 2 inches deep, ¼ inch wide, and coming in 10-foot lengths. This was done by the finishers from a Lakewood bridge from which they also cut the contraction or dummy joints. They were also filled with premolded felt strips and capped with metal channels. All the joint assemblies were supplied by the Highway Materials Co. at Jackson, Miss.

After the joints were inserted, the finishers pulled a burlap drag over the full width of the concrete to remove the surface laitance. Then they checked the finished slab carefully with long-handled straight-edges, and shifted a little mortar back and forth until they were satisfied that the surface was absolutely smooth. Farther back, 600 feet or more, came another Lakewood bridge from which the finishers pulled the metal caps from the joints. The felt strips were left in place, however, and the joints rounded off with a ¼-inch-radius edging tool. By this time the concrete had set up sufficiently so that it could be covered with Sisalkraft paper which came in rolls 22 feet wide. The paper prevented the moisture from leaving the concrete which is the essential requirement in any method of curing.

The forms were pulled after 24 hours but the paper was left on for 3 to 4 days.

(*Concluded on next page*)

C. & E. M. Photo

Burdine Construction Co. set up its Blaw-Knox 300-barrel bulk-cement plant at the Valley, Miss., siding of the Yazoo & Mississippi Valley Railroad. The Jaeger 105-cfm compressor at the side of the bin furnished air to aerate the cement for easy handling.

is exclusively

ADNUN

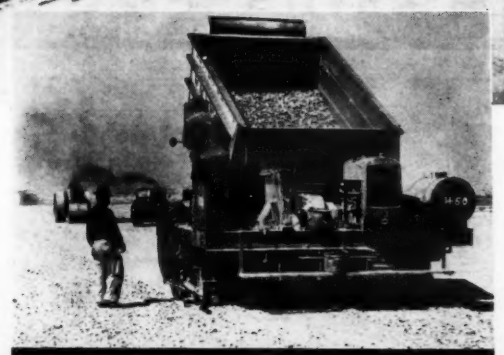
The Adnun is more than a black top paver. It brings you a flexibility impossible with any other black top paver.

You may be on a hot job today, a cold job tomorrow, or you may have to lay stone, soil cement or stabilized base the day after. The Adnun handles them all, leaving a smooth level course with clean edges. The overlapping cutter bar carries the material of the parallel course up to the joint, making the joint tight under pressure.

Maneuverability is easy and fast, saving time on return trips when starting a second course or parallel course. By means of the Adnun Carryall, which is easily attached, the Adnun can travel practically free and go almost anywhere.

Don't tie yourself down to a "one job" machine. Let us send you complete details.

THE FOOTE COMPANY, INC.
1916 State Street Nunda, New York



Above—Laying 1½ in. stone on an airport taxi strip job. *Below*—Rolling away to lay parallel course. The Adnun Carryall speeds up the job.

ADNUN
TRADE MARK REGISTERED
BLACK TOP PAVER

Builders of Adnun Black Top Pavers, MultiFoote Concrete Pavers and Foote Kinetic Mixers

For Over 70 Years Builders of Fine WHEEL BARROWS:
AMERICAN
STEEL SCRAPER CO.
Sidney, Ohio

"Who do you think you are, Lana Turner?"

Delayed Highway Job Paved With Concrete

(Continued from preceding page)

Paving continued right through the winter from November until the job was completed in April. Because of the season, not many full days of work were possible. Paving could not start until the temperature had reached 35 degrees and was on the rise, and operations ceased when a falling thermometer reached 40 degrees. The best performance for any one day was 2,100 feet of pavement.

Quantities and Personnel

The major items in the 8.87-mile concrete paving contract were:

Unclassified excavation	48,371 cu. yds.
Roadbed topping material	2,295 cu. yds.
Concrete pipe, 18 to 36-inch	132 lin. ft.
6-inch plain-concrete pavement	107,695 sq. yds.

A peak of 146 workers was employed on the project by the Burdine Construction Co. under the direction of W. A. Ross, Superintendent. Mr. Ross lives in Greenville, Miss., and commuted to work every morning by flying the 75 miles to the Yazoo City airport in about ½ hour. He also piloted his 3-passenger Piper Cub plane 35 miles in the opposite direction to cover another project of his company located in Cleveland, Miss.

The Mississippi State Highway Department was represented on the contract by Joe Sheppard, District Testing Engineer, assisted by Albert Banks. R. A. Harris is Chief Engineer of the Department, and S. A. Tomlinson, Jr., is Construction Engineer. E. W. Marley is District Engineer.

Welding Electrodes

Two new electrodes for arc welding steel at low base-metal temperatures have been put on the market by the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. These are the low temperature EutecTrodes 66 ac and 660 dc, flux-coated universal electrodes.

Claims advanced for them include a minimum of distortion, reduction in the number of rejects, easier and faster cleaning because less scale is formed at the low temperatures, and the elimination of preheating.

According to the manufacturer, they can be used for welding low-carbon steel to high carbon. They can also be used for welding low-alloy, high-carbon, cold-drawn, and heat-resistant steels, and for overlaying and filling on all types of cast-iron alloys. EutecTrode 66 is available in sizes of 3/16, 5/32, 1/8,. and 3/32-inch diameter and EutecTrode 660 dc in 1/4, 3/16, 5/32, 1/8, and 3/32-inch diameters.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 91.

The best way to do a job is the safe way. And the safe way is the best way.

NOT THIS-

BUT This!

with Silver STEERING BOOSTER

Fingertip pull on clutch steering levers opens clutches FULL TRAVEL. Ends frequent repairs to clutches, throwout bearings and brakes. Skinners do more and better work because angle-dozing, following contours and steering big crawler tractors does not mean sore muscles and exhaustion at the end of the day. For all crawler tractors. Installed on approval by your dealer.

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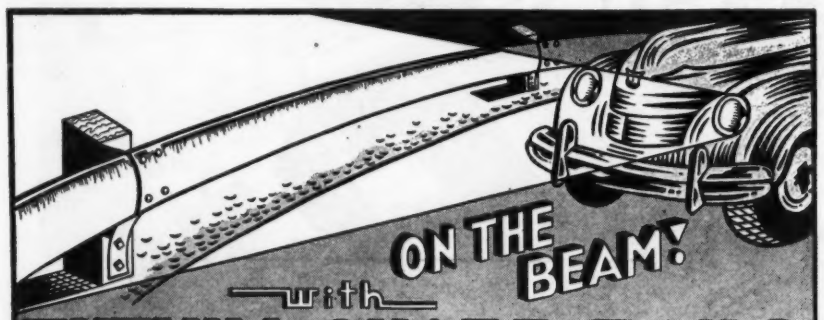

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Efficient: easily-seen, spring-mounted convex panels cushion and deflect blows.
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FASTER LOADING, LIFTING, SCRAPING

"The Ottawa" Industrial Hydraulic Front End Loader saves hundreds of man hours on every job. A rugged heavy duty attachment for industrial type tractors that loads bulk materials, does light bulldozing jobs and operates as a portable crane. A year 'round labor saver—will do hundreds of odd jobs better, faster. Handles loads up to 4,000 pounds, lifts to a height of 9½ feet. It is shipped complete with super-powered Hydraulic system. Bulldozer, Boom and Snow Plow attachment available to give you maximum productive use of your industrial tractor. Hundreds now in use by contractors, quarries, building material and coal dealers and municipalities.
Write today for prices and illustrated bulletin. Immediate shipment. Fits most models industrial tractors.

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DUFF-NORTON JACKS
to Speed Construction Work

AUTOMATIC LOWERING JACKS

Unexcelled in safety, low maintenance and easy operation, these jacks are available in 5, 10, 15, 20 and 25 ton capacities, for a wide variety of uses in construction jobs. Heights from 14" to 27¾".

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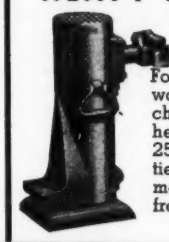


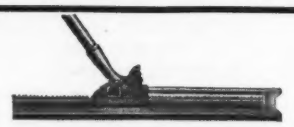
For bridge and wrecking work, handling heavy machinery, rigging and other heavy lifting. Made in 15, 25, 35 and 50 ton capacities. Available in sizes to meet the need. Heights from 22" to 27".

TRENCH BRACES

Duff-Norton trench braces are safe and economical for all trench and excavation jobs. Strong construction and quick installation. Complete with pipe in lengths from 16" to 60"—with extentions of from 6" to 10" according to size.

LOW HEIGHT SCREW JACKS

For bridge building, locomotive shops, shipyards and heavy construction work. Ideal for use in short heights and cramped areas where high lifting is required. Capacity—50 tons. Heights, 16" and 16½".



PIPE FORCING JACKS

Plumbing contractors, public utility companies, city water and sanitation departments find this double acting ratchet jack unique for laying or removing pipe in places of uneasy access. Capacity—15 tons. Length, 8 feet. Travel of cage, 7 feet.

PUSH AND PULL JACKS

Used by contractors, drillers, riggers, railroads, shipyards and industrial plants. Powerful for pushing apart or pulling together steel plate, sheet, beams, etc. Used with chains, hooks or pipe sleeves for increased range of applications. Capacities—10 to 15 tons. Overall lengths—24" to 38" or longer if desired.

These are just a few of the many types of Duff-Norton Jacks available for every construction requirement. Write today for Catalog 203 which illustrates and describes our complete line.

The Duff-Norton Manufacturing Co.
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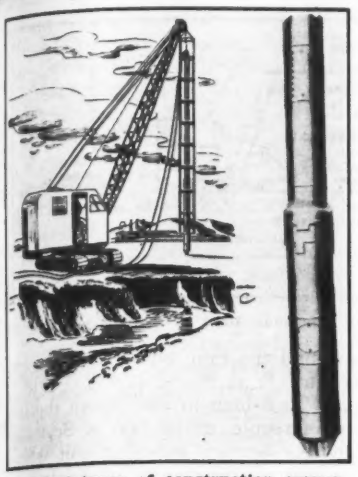

Standard types of construction cranes can handle the new cylindrical vibroflotation unit, which combines vibrations with jets of water to pack sandy soil into a mass solid enough to support building foundations, dams, and runways.

Sand-Compactor Uses Vibration and Water

A unit for compacting sandy soils by combining vibrations with jets of water has been built by the Baldwin Locomotive Works, Eddystone, Pa. This method, known as vibroflotation, is said to diminish the volume and permeability of soils, lessen the active soil pressure, and increase passive soil resistance.

The unit weighs 2,500 pounds and can be handled by standard types of construction cranes. A shaft with an unbalanced weight is used to produce a centrifugal force of 20,000 pounds. This unbalanced weight, carried by two SKF anti-friction bearings, is said to revolve at 1,800 rpm in order to set up the necessary vibrations. The vibrator is powered by a motor built by the General Electric Co. and designed to operate within the vibrator while it is submerged in wet sandy soil.

The cylindrical unit is said to be capable of packing soil in an area of 100 square feet to any required depth up to 100 feet at each application; and of compacting it into a mass solid enough to support building foundations, water-retaining dams, and heavy airport runways.

Originally built and tried in Europe, the first vibroflotation machine in the United States was developed and tested by Parsons, Brinckerhoff, Hogan & Macdonald, consulting engineer; and Merritt, Chapman & Scott, general contractor—both of New York.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 95.

Compressed Air Handbook

A reference text on applications, installation, operation, and maintenance of compressing equipment and air-powered tools of all types has been published by the Compressed Air & Gas Institute. The object in editing this handbook was to provide a comprehensive volume of reference data which would meet technical and engineering needs, and also serve the layman and student with information on the versatility, flexibility, and utility of modern compressed air power.

"Compressed Air Handbook" represents the collective knowledge, experience, and thought of the 20 member companies of the Institute. It was compiled over a 2-year period as a joint activity of the educational and technical committees. Included are definitions, test standards, and numerous basic tables and formulae. It also contains all of the standard reference material formerly published as "Trade Standards".

The book is 400 pages long, contains 247 illustrations and drawings, and has a stiff-backed simulated-leather cover. It sells for $3.00 per copy postpaid in the United States, and $3.50 per copy elsewhere. Copies may be obtained by writing to the Institute's offices at 90 West St., New York 6, N. Y.

Choose your lubricants carefully and use them wisely. Regular lubrication keeps your machines at work!

Some HAISS Equipment Uses!

Loaders for putting material into trucks twice as fast as an equivalent general purpose tool.

Loaders for making shallow grading cuts—as in stripping top soil at an airport, or otherwise.

Clamshell Buckets for high-power excavating—and getting the work done regardless of handicaps.

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Portable Conveyors for placing concrete—eliminating plank walkways and wheelbarrow labor.

HAISS-BUILT MEANS THE BEST IN DIGGING AND LOADING EQUIPMENT

There's scarcely a yard or construction project where a Haiss Loader, Clamshell Bucket or Conveyor cannot be put to work *making money* through the economies it provides in time, labor and operating cost. Haiss engineering leadership—plus the unparalleled efficiency of all Haiss-built materials handling equipment have been paying big dividends for Haiss owners for more than a half-century. Write for literature describing the particular Haiss unit you are interested in—or, better still, let us put you in touch with the Haiss representative who is nearest to you.

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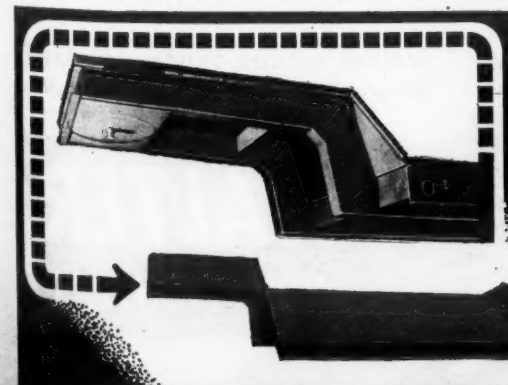

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The La Crosse heavy duty trailer's exclusively designed gooseneck construction provides a trailer with strength and performance second to none . . one piece main beams from end to end. Check this and the many other outstanding features and you'll "Look to La Crosse for transportation."

Dealers In 48 States

HEAVY DUTY LA CROSSE TRAILER CORPORATION LA CROSSE, WISCONSIN

SALES MANAGER WANTED

Midwestern manufacturer of motor graders and road rollers seeks experienced sales manager who can build distributor organization, plan sales campaigns and lead sales organization. Excellent opportunity for man with experience and progressive spirit. State age, experience and salary requirements.

Reply to Box 271
Contractors & Engineers Monthly
470 Fourth Avenue
New York 16, N.Y.

Batching Plant and Concreting for Dam

(*Continued from page 2*)

transported by conveyor 3, 85 feet x 30 inches, to the first stockpile. The next pile, containing 3 to 1½-inch stone, is fed by conveyor 4, a 24-inch belt 80 feet in length. The adjoining pile of 1½ to ¾-inch stone is supplied by conveyor 5, 100 feet x 18 inches.

Oversizes from this screening go through a Symons 4-foot cone crusher and a Telsmith 16B gyratory crusher to conveyor 7, 50 feet x 24 inches; this backtracks the material to conveyor 2 so that it will be rescreened. The smaller-size rock from this screening is picked up by conveyor 6, 105 feet long x 18 inches wide; it lifts the material on a 20-degree angle and drops it in a stockpile for minus-¾-inch stone. This pile feeds 110-foot x 18-inch conveyor 9, which moves the small-size stone to the secondary screening plant equipped with two 4 x 12-foot double-deck screens. From one screen ¾ to ¼-inch stone is obtained and sent along conveyor 10, 115 feet x 18 inches, to a stockpile in line with the others.

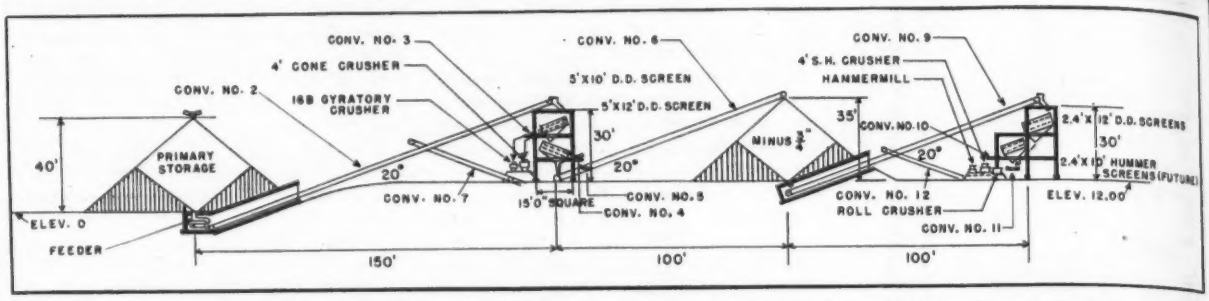
Sand, or fines less than ¼-inch, is obtained from the other screen and moved to the minus-¼-inch stockpile on 18-inch conveyor 11, which is 95 feet in length. Material collected on this screen is crushed further in a hammermill and a Symons 4-foot short-head crusher. It is then sent via conveyor 12, 55 feet x 18 inches, back to conveyor 9 which sends it through the screening plant once more.

The five stockpiles in a row average 35 feet in height and are 50 feet apart. Material from any one pile is fed to an underground 30-inch belt 330 feet long, conveyor 8, which is carried in a pipe buried beneath the stockpiles. At the end of the piles it rises on a 20-degree incline to dump into a washing screen at the top of a 30-foot-high platform. From there the stone falls into a 50-ton bin under which the trucks run when getting a load.

Hauling the aggregate from the crushing plant to the concrete-mixing plant at the dam site has been sub-let by Lambert Brothers and Kershaw Mining Co. to Shinall Bros. Trucking Co. of Cartersville, Ga. The firm uses 30 new Ford trailer trucks of 11-yard capacity for the 15-mile haul over the north access road to the aggregate bunkers at the batch plant.

Concrete-Mixing Plant

The concrete batching and mixing plant is located high on the hill on top of the north abutment. To the rear of the plant are the aggregate bunkers, four in number, for the four sizes of coarse aggregate, and a large bin for the sand. Built of wood, the bunkers for the coarse aggregate measure 38 x 21 feet each. The sand bin is 101½ feet



Layout of the crushing and screening plant which is producing the aggregate for Allatoona Dam in Georgia.

long x 21 feet wide. They all average 25 feet in depth. Together they contain enough aggregate for 2,400 yards of concrete, or the average day's run when two 8-hour shifts are being worked.

Directly beneath the bunkers is an 84-inch-diameter tunnel made of Armco tunnel liner plate, 285 feet long. Through this tunnel runs a 30-inch conveyor belt which carries the aggregate from the bunkers to the storage bins above the concrete mixer. Holes have been made in the top of the tunnel to admit the sand and stone. Each aggregate bunker has two hopper-bottom gates, while the sand bin has eight gates.

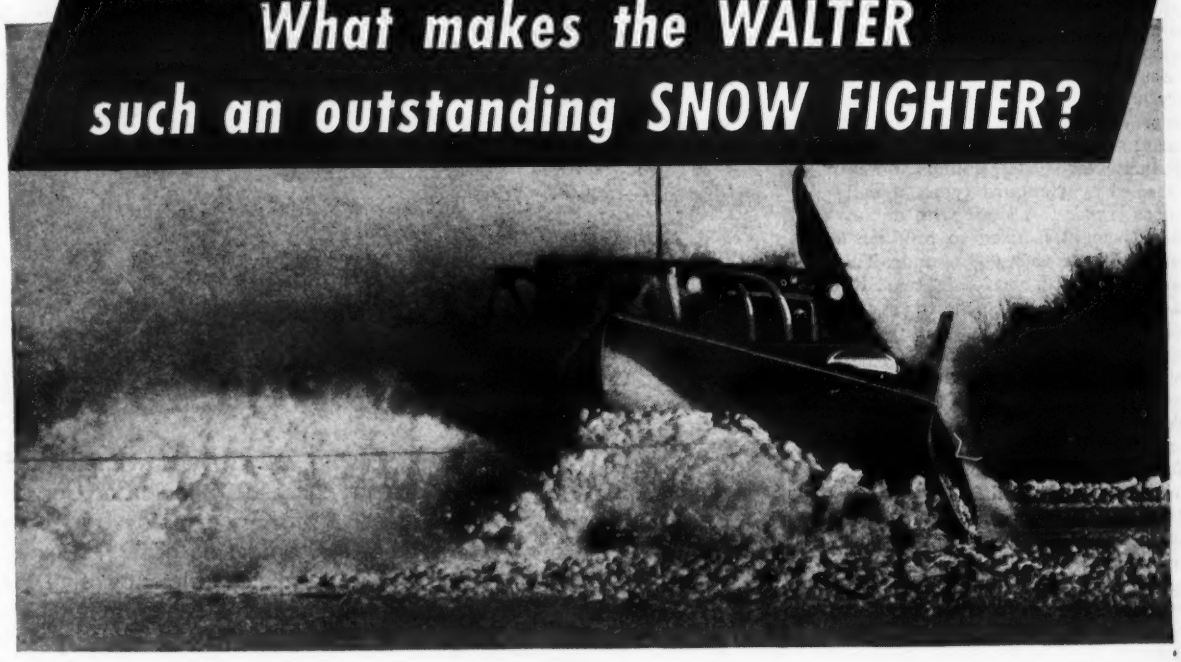
After leaving the tunnel the aggregate moves along on two flights of conveyor belt, each 180 feet long, at a 16-degree angle to the top of the batch plant. The aggregate is moved one size at a time. A Noble 750-ton 5-compartment bin of structural steel holds the sand and the four types of coarse aggregate: ¼ to ¾, ¾ to 1½, 1½ to 3, and 3 to 6-inch in size. From the bin the aggregate drops into a Scientific Concrete Service batching unit which also controls the amount of moisture in each batch. Weights are recorded on a Toledo dial scale.

Bulk cement, both slag and portland, is received at the unloading yard in hopper-bottom cars. Magnolia slag

(*Continued on next page*)

Use—
Sure Cure
CONCRETE CURING COMPOUND
Clear or Pigmented
Used wherever concrete must be protected during curing period. Write for details.
S. P. LYONS 1805 Courtney Ave. Los Angeles 46, Calif.

What makes the WALTER such an outstanding SNOW FIGHTER?



1. TRACTION — the most vital requirement to enable a truck to navigate snow, ice and slippery surfaces, without stalling or side-slipping. Only Walter Snow Fighters provide 100% traction at all times—because only Walters have the patented automatic lock differentials to concentrate power on the wheels having traction at all times. This provides steady tractive power, prevents wheel-spinning and stalling.

2. POWER This means more than horsepower—it means tractive power or driving force. Walter Snow Fighters not only have powerful motors (150-350 hp.) but every horsepower is utilized by the exclusive Walter 4-Point Positive Drive. You can mount the biggest plows—tackle the biggest drifts.

3. SPEED Not merely rated highway speed—but sustained speed while operating in snow and ice and on slippery surfaces, clearing 2 and 3 feet of snow and blasting through deep drifts. Because of the combination of high traction and power, Walter Snow Fighters travel at speeds of 20-30 mph., throw snow far off the road, clear more miles per hour, make widening easier.

4. SPECIAL DESIGN Not only the Walter drive system — but the entire unit is scientifically designed and ruggedly built for snow removal. This includes its plows, controls, hydraulic equipment, cab, lights and every detail that provides efficient clearing and easy, safe handling.

FOR MORE DETAILS—see your nearest Walter distributor or write us for illustrated literature.

WALTER MOTOR TRUCK COMPANY
1001 Irving Ave., Ridgewood 27, Queens, L. I., N. Y.

WALTER SNOW FIGHTERS

cement is purchased from the Southern Cement Co. at Birmingham, Ala., while the portland cement is bought from four different companies—Lehigh and Alpha in Birmingham, Ala.; Signal Mountain in Chattanooga, Tenn.; and Penn-Dixie in Richard City, Tenn. At the yard a 16-inch Link-Belt screw conveyor under the tracks unloads the cement to two Blaw-Knox cement bins: a 1,500-barrel bin for the portland cement, and a 1,000-barrel bin for the slag cement. In the mix the ratio of slag to portland cement is 1 to 5.

The bulk cement is hauled 3 miles to the batch plant in three Ford specially built end-dump tank trucks holding 7 tons each. The slag cement is dumped directly into a hopper built over a 1,500-barrel silo, while the portland cement is dumped into a hopper at ground level. From there it is raised in a 55-foot enclosed Link-Belt bucket elevator to two 3,000-barrel silos. Underneath the silos are two 14-inch screw conveyors. These move the cement to the bottom of an 85-foot enclosed bucket elevator alongside the batching plant. It is then raised to the proportioning unit.

River water could not be used either for drinking purposes or for concrete because of the high silt content, so the contractor had to develop his own water supply. A crib dam, 15 feet high x 150 feet long, was built in a sidehill canyon on the north side of the river just below the dam site. This dam blocked off the flow of a creek, forming a water-supply pool at elevation 753.0.

A Fairbanks-Morse 4-inch 2-stage 60-hp electric centrifugal pump pumps water 1,600 feet, through 4-inch thin-wall welded pipe, to a 50,000-gallon tank at elevation 1,000, the highest point of land on the north bank, at the rate of 450 gpm. From this supply tank the water flows by gravity to all parts of the project. The drinking water is chlorinated for safety.

In the warm weather the water for the concrete is precooled by three Chrysler dual 5-cylinder refrigerating units which have a capacity of 75 gpm each. In this way the temperature of the water can readily be reduced from 85 to 35 degrees F if necessary. In cold weather the water will be heated in a vertical-type boiler to between 40 and 60 degrees F. The temperature of the concrete is never permitted to go above 80 degrees F, and 40 degrees F is the lower limit.

The concrete is mixed in two Smith 4-yard tilting mixers for 2½ minutes, and then discharged into specially designed Gar-Bro 8-yard buckets. Three of these large buckets are on the job; while one is being emptied the other is getting filled, while the third is held in reserve as a spare.

Cableway System

The concrete is delivered to all parts of the dam by a Washington Iron Works cableway system. It consists of a head tower, a tail tower, and connecting cables for the 1,710-foot span. The cableway head tower is located on the north side of the river on the same bench with, but just to the rear of, the concrete plant. Its 100-foot-high Consolidated Steel mast is secured in position by two Lockcoil 3-inch backstay cables, 400 and 600 feet long, anchored to 430-ton concrete blocks embedded in rock. The elevation of the head-tower bench is 920.0.

On the opposite south bank of the river at a bench elevation of 1,000.0, the 45-foot-high tail tower travels on two sets of standard-gage tracks laid on 28-foot centers. It moves on an 800-foot arc, propelled by a 100-hp electric motor, in order that the concrete buckets may be discharged over any point in the dam. A 428-ton concrete counterweight on the traveling tower prevents it from overturning under the stress to which it is subjected.

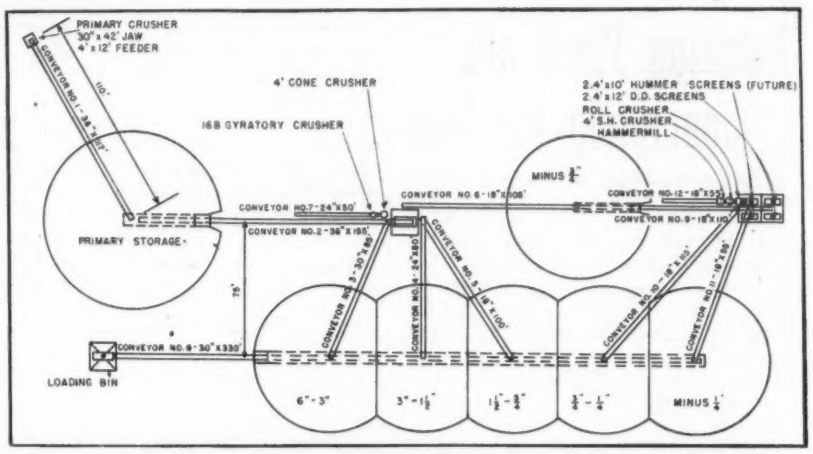
The 1,710-foot distance between the towers is spanned by an American Lockcoil 3-inch track cable on which rides the Washington Iron Works 16-wheel cableway carriage. It was designed to carry 25 tons. But it moved 40 tons with ease when the whirley-crane cab was shifted from one side of the river to the other. The carriage moves at the speed of 1,300 feet per minute, and a 20-ton load can be raised or lowered on a 4-part line at the rate of 325 feet per minute. A 1-inch endless cable moves the carriage along on the track cable; the load line is ⅞ inch in diameter and has a line pull of 11,000 pounds. All the operating cables are Roebling.

For night work the project is illuminated by a string of fifty 1,000-watt globes and reflectors hung on the cableway. These are augmented by several banks of stationary floodlights set up on the sidehills.

Concrete Work

The big buckets for the concrete are first placed on a flatcar riding on a standard-gage track which runs under the discharge chutes of the mixers. When a bucket is full, the car is pulled along the 200-foot track by a Baldwin 10-ton electric locomotive until it is under the cableway. Then the carriage picks it up, carries it out over the dam, and lowers the bucket to the wooden forms where it is discharged.

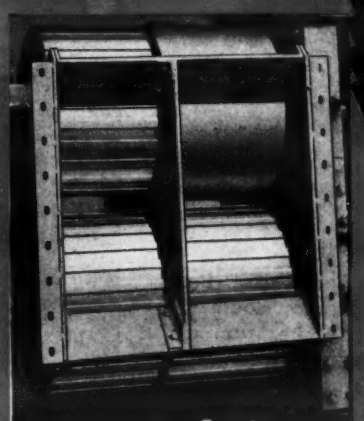
(Concluded on next page)



Plan of the aggregate crushing and screening plant and stockpiles of material on the Allatoona Dam job.

NOW TWICE THE YARDAGE

UNIVERSAL'S NEW TWINDUAL* MASTER GRAVEL PLANT



Feed Opening View TWINDUAL Rolls

*TWINDUAL Rolls, the exclusive patented Universal development which gives two full stages of secondary reduction in one crusher. Its use provides amazing capacity with savings in weight. Permits 100% wider jaw crusher discharge opening, more than doubling its capacity and reducing jaw wear. *PATENTED

Top capacity plus *ready portability,* you get both and *more* in the new TWINDUAL* MASTER... the first completely *new* post-war gravel plant. Three full stages of reduction with only two crushers. First stage—jaw crusher; second and third stages—TWINDUAL* Rolls. Size for size and weight for weight the TWINDUAL* MASTER has no equal for production where crushing must be done. Under identical pit conditions it has produced twice the yardage of larger conventional model plants. Its record smashing capacity, smooth operation with minimum vibration, and remarkably low power requirement is setting an entirely new standard for low cost production of finished aggregate.

3 STAGES OF REDUCTION WITH ONLY 2 CRUSHERS

Complete details available in bulletin 682. Write for it.

UNIVERSAL ENGINEERING CORPORATION
620 C AVENUE, N.W. CEDAR RAPIDS, IOWA

Batching Plant and Concreting for Dam

(Continued from preceding page)

Concrete is being placed in 25 monoliths, 40 to 60 feet wide, across the full thickness of the dam. For the four lifts up from the foundation the placements are only 2½ feet thick. Above that the concrete is placed in 5-foot lifts which have a 5 per cent slope or drop to the upstream face. Placing is done in alternate monoliths with a 5-day interval between lifts.

The wooden forms are constructed of 1¼-inch sheeting made up in 50 x 5-foot panels, and held in place by anchor rods secured into the previous pour. On the contraction-joint sides, double 2 x 12 studs are used for cantilever-type panels; on the face forms double 3 x 8 studs suffice, since the face panels are non-cantilever type. The studding is tied together by wood wales. Chicago Pneumatic air vibrators are used to vibrate the concrete.

No longitudinal expansion joints are in the dam, nor pipes to circulate water for cooling the concrete. By controlling the temperature of the mixing water, keeping the height of the lifts shallow, and keeping the concrete well watered during a 14-day curing period, no trouble with expansion is experienced. During the hot summer the pouring was done in two night shifts, while a day shift is worked in cold weather. Water is sprinkled over the top of the lifts during the curing period, and sprayed over the sides by means of a ½-inch pipe hung from the forms erected for the next lift. The pipe is fitted out with spray nozzles.

On a bench level near the concrete plant, a work area was set up for the construction of the wooden forms for the three draft tubes. The gooseneck-shaped tubes, 69 feet long, are 14 feet in diameter at the inlet; at the other end they form a rectangle, 45 feet wide x 17 feet high. They were built to their full length, then cut into sections for easier handling, and carried across the river on the cableway for temporary storage on the south side. They will be erected for concrete placement when work gets under way on the powerhouse.

Color Film on Aggregates

A film on the production and use of aggregates in modern construction has been prepared for the Iowa Mfg. Co., Cedar Rapids, Iowa. A large part of the movie is devoted to showing projects where aggregates were a vital part of the construction program—dams, famous highways, bridges, locks, railroads, etc. It is designed to show the general public, as well as the contractor or engineer, the part aggregates play in the building of these and similar structures.

The film also shows the various pieces of equipment built by the Iowa Mfg. Co., for producing aggregates and mixing asphalt. Internal operational features are graphically pictured by means of animated drawings.

Entitled "A World of Aggregate", the film is available for showing at meetings, conventions, luncheons, etc. It has been produced on 16-mm Kodachrome film, and has a sound track which combines dialogue and music. Showing time is 40 minutes. Additional information on the film can be obtained from the company.

Angling-Blade Bulldozers

Angling-blade bulldozers are the subject of Catalog No. 10231 of the Caterpillar Tractor Co., Peoria 8, Ill. Basic specifications and production features of the cable-controlled No. 8A and No. 7A are stressed in this 8-page booklet. These bulldozers are designed for use with the Caterpillar D8 and D7 track-type tractors.

Illustrations and cutaway views are used to emphasize the features of the Caterpillar blade C-frame, brace, sheave, push-cup construction, and also the angling, tilting, and lifting adjustments possible. Several job scenes showing these bulldozers in action are used to illustrate some of their applications.

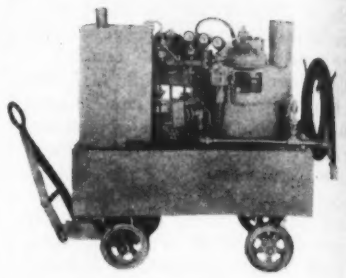
Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 76.

Agent for Derrick Firm

The appointment of a direct factory representative for the Pacific coast area has been announced by the American Hoist & Derrick Co. of St. Paul, Minn. Formerly associated with the home office, Clifford N. (Pete) Peterson will make his headquarters in San Francisco.

Slash Cleaning Costs!

NEW Oakite-Vapor Unit puts the emphasis on speed . . . to save you cleaning dollars. Generates 100 lbs. of steam in 1 minute (rated capacity 200 p.s.i.) when and where you want it. Just flick the switch! Fuel capacity provides 8-hour, non-stop steam-detergent cleaning or paint-stripping cranes, crushers, diggers, excavators. Two-gun cleaning action. Vibrationless operation. No clogging of heater coils, because cleaning solution by-passes coils. Stationary, mobile models available NOW. Write.

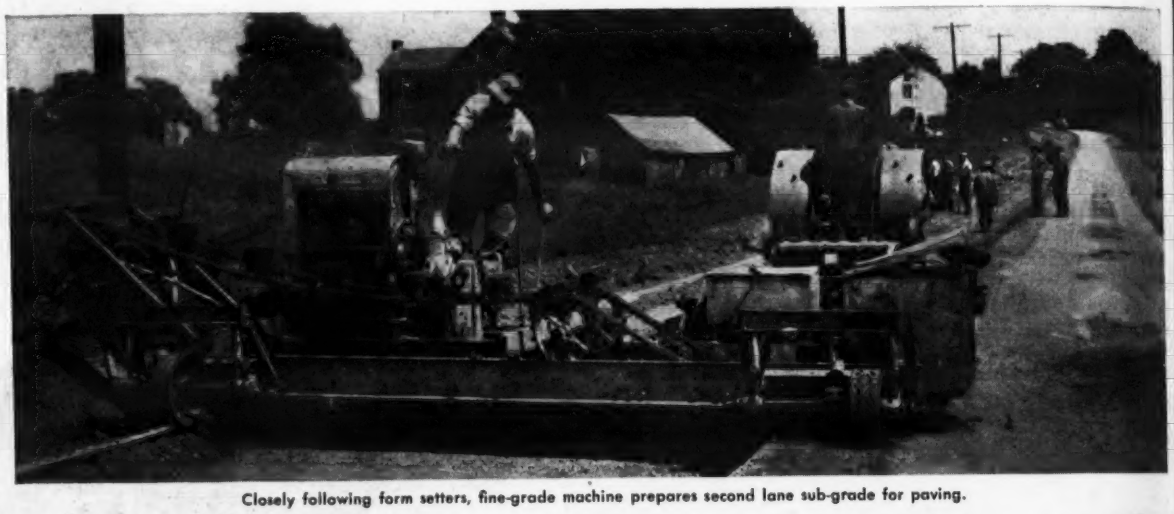


OAKITE PRODUCTS, INC., 72 Thames St., NEW YORK 6, N.Y.
Technical Representatives in Principal Cities of U.S. & Canada

OAKITE REG. U.S. PAT. OFF.

MATERIALS
METHODS
SERVICE

Specialized Industrial Cleaning

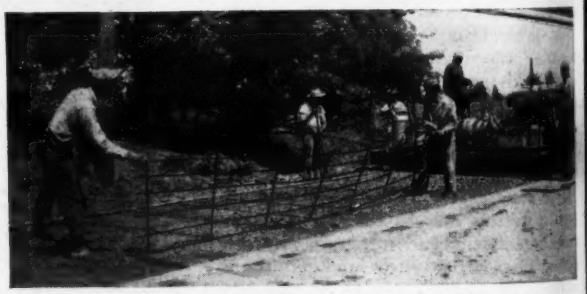


Closely following form setters, fine-grade machine prepares second lane sub-grade for paving.

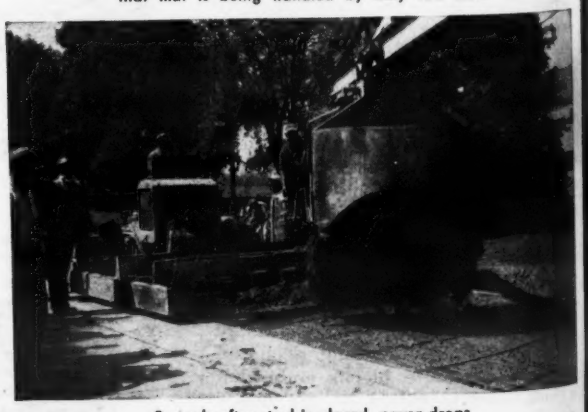
Building New Roadway on Pennsylvania's Skippack Pike

Left to right: M. W. Sweeney, Senior Construction Inspector; J. C. Feltman, Mixer Foreman; Charles J. Wolf, Concrete Superintendent; E. F. Rodia, Asst. Construction Inspector; and W. J. Houck, Resident Engineer.

Taken between Skippack and Bethel Hill, Pa., these photographs show construction on Route 73, commonly called the Skippack Pike, running northwest from the Tacony-Palmyra Bridge over the Delaware River. This stretch of the highway, more than two miles in length and replacing a section long in need of repair, is being built by John H. Swanger, Lancaster, Pa. Reinforcing bars, bar mats, road joints and guard rail were among the highway products furnished by Bethlehem.



Bethlehem Hinged Bar Mat goes into place. Note that mat is being handled by only two men.



Seconds after steel is placed, paver drops batch over Bethlehem Hinged Bar Mats.

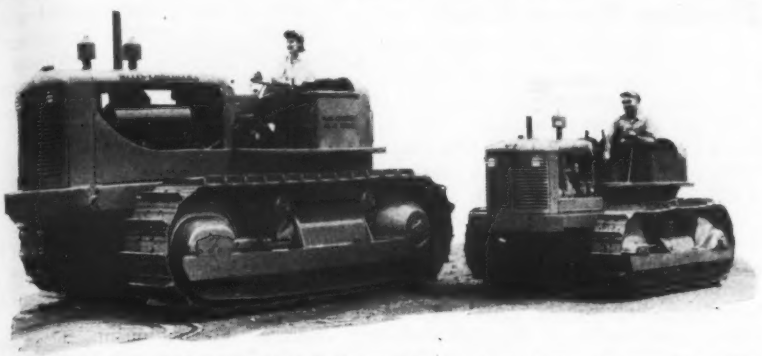
As transverse screed (foreground) trims off excess cement, longitudinal screed smooths concrete for hand-brushing.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

STEEL FOR HIGHWAYS

Road Joints • Reinforcing Bars • Bar Mats • Guard Rail
Tie-Rods • Guard Rail Posts and Brackets • Spikes
Wire Rope and Strand • Hollow Drill Steel
Fabricated Structural Steel • Bolts and Nuts
Sheet and H-Piling • Timber Bridge Hardware

BETHLEHEM STEEL



The unusual size of the new Allis-Chalmers HD-19 20-ton tractor is shown in this comparison with the smaller HD-5.

Production Starts On 20-Ton Tractor

A 20-ton track-type diesel tractor is in production at the Springfield, Ill., plant of the Tractor Division of Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. The HD-19 has a track tread of 84 inches with 8 feet 10⅝ inches of track in contact with the ground on a flat surface. The A-frame is designed to eliminate twisting strains and to provide rigid track alignment. Ground clearance is 16 inches. A 3-stage hydraulic torque converter has been introduced into the power train to increase its working capacity.

Power is provided by a 6-cylinder 2-cycle General Motors diesel engine. Features claimed for this engine include instant starting, 4-way cooling, and parts interchangeable with other GM Series 71 units.

Hydraulically controlled steering and an improved seat have been incorporated in the new tractor for greater operator efficiency. Other safety and comfort features claimed for this unit are adjustable brake pedals, self-energizing brakes, improved arrangement of controls, and a large operator platform. Operating adjustments, maintenance points, and major assemblies are located and designed to simplify maintenance and repair. Grease-packed truck wheels, idlers, and support rollers are said to require greasing once every 1,000 hours. The transmission provides two forward speeds and one reverse.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 98.

Engine-Driven Welder

A light-weight engine-driven welder has been announced by the Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa. This Flex Arc welder is available as a portable or stationary model.

Design characteristics of The Ranger are said to provide easy striking and maintenance of the arc for shop quality welding on steel, cast iron, alloys, hard surfacing aluminum, and brass. The generator is direct-connected to a Hercules IXB engine.

Welding current is adjustable from 30 amps at 20 volts to 250 amps at 30 volts. The four major steps of adjustment are made by plugging screw locking plugs on work and electrode leads. Intermediate values are obtained by rheostat control. Polarity is controlled by interchanging work or electrode lead connections.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 22.

Ateco Northwest Agent

The appointment of the Howard-Cooper Corp. as distributor in Oregon and western Washington has been announced by the American Tractor Equipment Corp., Oakland, Calif. Sales and service of the Ateco 2-wheel and 4-wheel scrapers will be available through the Howard-Cooper office in Portland, Seattle, Albany, Eugene, Roseburg, Central Point, and Klamath Falls.

Dump Truck Holds 22 Tons

A 22-ton-capacity dump truck is the subject of folder No. 105 issued by The Euclid Road Machinery Co., Chardon Road, Cleveland 17, Ohio. The Model TD Rear-Dump Euclid has a struck-measure capacity of 14.8 cubic yards. It is powered by a 240 or 275-hp diesel engine.

The folder features descriptions of the Euclid drive axle, the frame, twin hoists for dumping, and the heavy-duty transmission. Other features of construction and operation are covered by an entire page of specifications and dimensions. These include the engine, hydraulic system, body, tires, cab and seat, etc.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 66.

YOU'RE NEVER IN A PINCH FOR POWER AND LIGHT—with

Performance Proved WITTE DIESELECTRIC PLANTS Trade Mark Reg.

Producing your own dependable electric light and power at cost with a simple, sturdy WITTE Dieselectric Plant is a profit-adding advantage on every job you take. There's no guesswork about WITTE performance—thousands are in continuous use around the world.

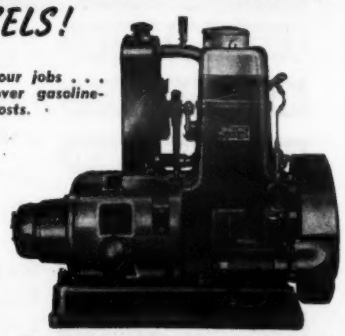
You get steady, strong current output—bringing daytime visibility to nighttime operations, or powering compressors, pumps and other equipment. Yet WITTE Dieselectric plants require little space, care or fuel.

Start and Operate on Ordinary Diesel Tractor Fuel . . . THEY'RE FULL DIESELS!

Keep gasoline off your jobs . . . save up to 75% over gasoline-powering costs.

7.5 KVA WITTE DIESELECTRIC PLANT WITH CONSTANT VOLTAGE GENERATOR

Portability multiplies usefulness of WITTE Dieselectric Plants—they are easily mounted on skids. There's a size and type of vertical or horizontal WITTE Diesel unit to meet your exact needs. See your WITTE Dealer, or write factory direct for descriptive literature on the complete WITTE line.

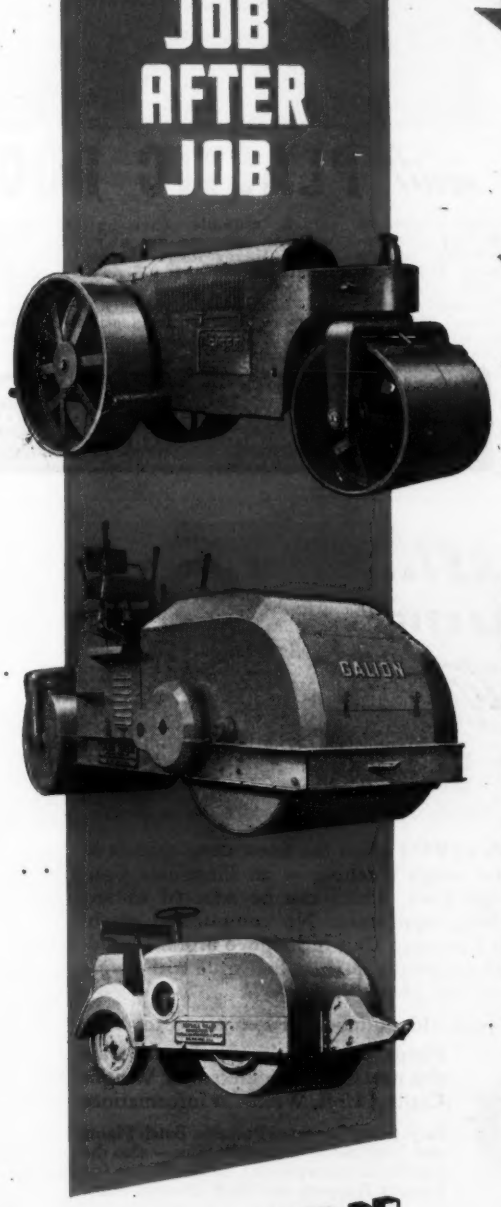


7.5 KVA WITTE Direct-Connected DIESELECTRIC PLANT

WITTE ENGINE WORKS
DIVISION OF OIL WELL SUPPLY COMPANY — UNITED STATES STEEL CORPORATION SUBSIDIARY
AMERICA'S PIONEER BUILDER OF SMALL DIESELS — KANSAS CITY 3, MO., U. S. A.

FOR PROFITS- JOB AFTER JOB

Roll with GALION



THREE-WHEEL

The roller that does an unrivaled job of compaction on fills and other primary rolling. 6-7-8-10 and 12 ton sizes.

TANDEM

Rolls out a top surface of superlative smoothness and density. Highly maneuverable for precision rolling. 3-5-8-and 10 ton sizes--variable from 3 tons up to 14 tons.

PORTABLE

Puts surface maintenance on an economical basis. Easy to haul from job to job--yet it does a thorough job of compaction. Weight 6700 lbs., variable up to 9367 lbs.

Write for name of nearest GALION Distributor.

The GALION IRON WORKS & MFG. CO.
General and Export Sales Offices
GALION, OHIO, U. S. A.

GALION IRON WORKS — hydraulic GRADERS · ROLLERS

The Extendo step can help truck owners prevent injuries to their men caused by jumping off and on trucks. The step is retractable and will slide back into its frame if the truck is backed up against some obstacle.

Truck Step Retracts

A retractable step for use in getting on and off the rear end of trucks has been developed by the Extendo Corp., 4950 Melrose Ave., Los Angeles 27, Calif. The outstanding feature claimed for the Extendo No Break step is that it will not break off if the truck is backed into an object while the step is extended. The manufacturer states that when this occurs, the step will automatically slide back into its frame or rack. It is attached to the truck by four bolts.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 48.

Catalog on Tunnel Forms

A catalog describing steel forms for tunnels and related tunnel equipment has been prepared by Robert S. Mayo, Lancaster, Pa. This 8-page 2-color bulletin is punched for insertion in a 3-ring loose-leaf folder.

Bulletin No. 12 describes the various tunnel forms of Mayo design. These include telescopic and non-telescopic types, subway forms, hand-handled forms, forms for sewers and conduits, box sewers, and cut and cover subways, as well as tunnel shields, shield jacks, hydraulic pumps, air locks, and jumbos for drilling, timbering, etc.

The catalog is well illustrated, showing Mayo forms in use on projects throughout the world. Descriptive text explains how the forms were used and placed. Bulletin No. 12 also lists the information required if an estimate is desired from Mayo.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 55.

Bitumen Spray Unit Built as a Trailer

A trailer unit for use in distributing tar, asphalt, road oil, emulsions, etc., is made by Littleford Bros., Inc., 485 E. Pearl St., Cincinnati 2, Ohio. The Trail-O-Distributor consists of the rear end of a Spray-Master bituminous distributor mounted on a 2-wheel pneumatic-tired trailer.

This unit is recommended by the manufacturer for projects having a long haul from their supply source of bituminous material. A fleet of supply tanks can go back and forth for material and the trailer can be hooked on to each to apply the material to the road. As each supply tank becomes empty, the Trail-O-Distributor is hooked onto another tank and steady progress is thus maintained, the manufacturer points out.

The Trail-O-Distributor has a single-valve control, will handle spray bars up to 24 feet, and has a 350-gallon pump rated at 350 gpm at 350 rpm. In addition to spraying, the unit can be used as a transfer pump for filling or unloading storage tanks or drums, or tank cars.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 94.

Repairing Concrete Bridge Deck

Pressure Vibration POWER TROWEL *Bonds Concrete*

Permanently bond new concrete—restore disintegrated concrete—with combination of pressure and horizontal vibration supplied by Power Trowel. Modern tool. Air turbine motor. 10,000 vibrations per minute. Hand operated. Snap-on handles. Quick—lasting—low cost jobs. Write for facts—send us your vibration problems.

THE INTERNATIONAL VIBRATION CO.

16700 Waterloo Rd., CLEVELAND 10, OHIO

New 12'-0" Macadam Vibrator now ready for macadam road and airport construction.

You can quickly and profitably trowel a smooth, resilient, long-lived surfacing right over that old concrete or wood floor.

***with* PLASTIC ROCK!**

Plastic Rock comes complete, packed in barrels. Nothing more to buy. No application "formula" to confuse. Simply mix and trowel right over old floor; average depth one-half inch. Old floor Saturday is a new floor Monday. Plastic Rock is absolutely spark-proof, skid-safe even when wet, dustless, silent. Feels like cork under foot. Cannot splinter, crack, crumble, curl or loosen. Also patches concrete to a perfect feather edge. Heavy loads on steel wheels actually improve it. Five-year-old floors show no wear. Used by largest railroads and industries in America. Over 600 contractors have found Plastic Rock a good-will builder and profit source. No special equipment needed. Not for home use.

Ask for comprehensive and convincing Report 220-C-10

UNITED LABORATORIES, INC.
16815 EUCLID AVENUE • CLEVELAND 12, OHIO
In Canada—STORRAR MFG. COMPANY, Weston, Ontario
Representatives everywhere, including foreign countries

ROCKFORD

OVER-CENTER CLUTCHES

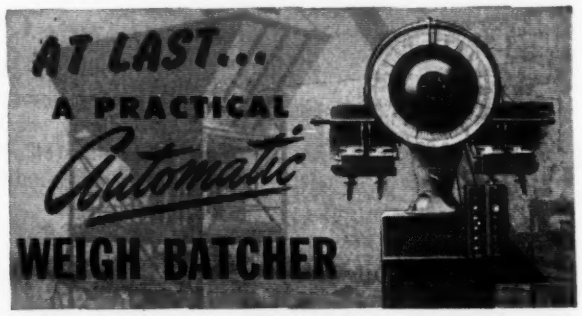
EASY OPERATION
HIGH TORQUE
POSITIVE ENGAGEMENT
LARGE DRIVING AREA
SMOOTH RUNNING
INFREQUENT ADJUSTMENT
MINIMUM INERTIA

* Equally spaced, hardened and ground roller cams, bearing upon hard steel insets, exert heavy pressure evenly over the entire ROCKFORD Over-Center CLUTCH face — producing unusually high torque, for the clutch size and weight.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD CLUTCH DIVISION BORG-WARNER
314 Catherine Street, Rockford, Illinois, U.S.A.



NOW CONVEYCO offers the finest development in automatic weigh batching — an Electronic Controlled Weigh Unit, which can be adapted to any weigh batching equipment. No complicated mechanisms. This Conveyco Unit is designed around standard electrical equipment, using a dial scale with *single indicator* and *one photo electric cell.*

Modernize your old outmoded Batchers, Ready Mix Plants or Asphalt Hot Plants with this new Conveyco Electronic Weight Control Unit. Write for information.

Investigate Conveyco Portable Batch Plants and Portable Bulk Cement Silos — also the Conveyco never-leak Cement Valve for Cement Hoppers and Bulk Cement Silos.

THE CONVEYOR CO.
ENGINEERS • MANUFACTURERS

Indicators on the Big Beam No. 311 electric hand lamp show its user how much charge remains in the battery. The lamp throws a 2,500-foot beam.

Electric Hand Lamp Shows Battery Charge

A battery-operated hand lamp which shows at a glance when the battery charge is low is made by the U-C Lite Mfg. Co., 1050 W. Hubbard St., Chicago 22, Ill. The No. 311 portable rechargeable electric hand lamp is said to throw a 2,500-foot beam of light.

The Big Beam lamp has three transparent windows, one for each battery cell. In each window there are three specific-gravity ball indicators, one green, one white, and one red. When the green ball is down, the battery is 5 per cent discharged; when the white ball is down, 50 per cent discharged; and when the red ball is down, 95 per cent discharged. When fully charged, all three balls rise to the water-level line.

The battery case is said to be spillproof, even if the lamp is held upside down. The battery delivers 6 volts at a 20-ampere-hour capacity. Its shelf life is listed at 90 days under favorable conditions.

The chrome-plated lamp head has a 5-inch diameter and a 6-inch-diameter triple silver-plated reflector. The double-throw switch is of the single pole-toggle type. The main bulb is a 6-volt 2.35-amp prefocused-base type. The auxiliary bulb is the standard G-E No. 55-6 volt. The stirrup-type head bracket is adjustable to a 170-degree vertical position.

Accessories include a hold-down bracket; carrying strap; resistance switch; wire guard; snap-on lenses, red, green, blue, and floodlight; a charger with a 15-foot extension cord; and a 6-volt 25-watt bulb and adapter.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 45.

Foreknowledge of Causes Aids Accident Prevention

"What you don't know, *will* hurt you" when it comes to accident prevention. For accidents are usually caused by somebody not knowing something.

An article which describes some of the hidden causes of accidents appeared in the July issue of the *American Mutual Magazine*, house organ of the American Mutual Liability Insurance Co. It is entitled "Hazards of the Unknown".

Some of the main causes of accidents which this article lists are: the worker who is unfamiliar with a safe work procedure, the foreman who doesn't know how to instruct, the maintenance man who doesn't know that his failure to replace a guard may be tantamount to signing a death warrant, the plant engineer who doesn't know the critical limitations of the process he installs, and the management which doesn't know how to organize.

Fortunately, something can be done about each of these causes. The fund of knowledge about accident prevention is large and is constantly increasing. Safety engineers, guided by the principles of engineering, can predict and find hazards before the accident occurs, and can prescribe means of control.

The article emphasizes that the biggest danger among unknowns lies in newly developed machines and processes. Bugs in these are not always revealed in the development stage, and care must be exercised in their use. The article points out that prompt exploration for unknown hazards should be adopted as standard procedure.

Two-Wheeled Scoop For Small Dirt Jobs

An earth scoop with a heaped capacity of 1½ cubic yards has been announced by the Duplex Mfg. Co., 21st & Locust Sts., Omaha, Nebr. It is designed for use with any tractor equipped with power hydraulic lift. Power is applied by the hydraulic pump on the tractor to the hydraulic rams on the scoop.

The Duplex scoop can be used for hauling, dumping, or scraping. The amount of material dumped can be varied from a minimum to the complete load. Cutting depth varies from 0 to 5 inches. Width of the cutting blade is 4 feet; dumping angle is 85 degrees. Both loading and unloading operations are power-operated.

Length of the scoop is 9 feet; height, in carrying position, is 3 feet 6 inches; width is 6 feet 2 inches; and weight is 950 pounds. It uses two 6.00 x 12 farm-implement tires.

Further information may be secured from the company, or by using the enclosed Request Card. Circle No. 7.

Folder on Admixture For Mixed-in-Place Work

A 4-page folder describing the Soilpak process for mixed-in-place operations on highways, airfields, road shoulders, etc., has been prepared by the Service Engineering Co., 360 Springfield Ave., Summit, N. J.

The folder describes the use of Soilpak powder in asphalt-emulsion aggregate mixtures. It tells about several projects in which this substance was used, and the results obtained. It also lists types of jobs where the Soilpak process could be used to advantage.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 60.

LIFT! LOAD! HAUL! DIG
WITH A
UNIT 357
MOBILE CRANE
IT'S SELF-PROPELLED
IT RIDES ON RUBBER
IT HAS 1001 USES
The UNIT 357 Mobile Crane is designed to handle a wide variety of jobs both on and off the highway. Compact . . . it works efficiently in close quarters. Sufficiently narrow for convenient road travel . . . and as easy to handle as an automobile.
Operated by ONE man . . . Powered by ONE engine . . . Full Vision Cab gives operator complete visibility in every direction.
The complete UNIT 357 story . . . its Low Cost . . . its Fast Delivery . . . its many modern and exclusive features will convince you. Write for it today!
UNIT CRANE and SHOVEL CORP., 6309 W. Bernham St., Milwaukee 14, Wis., U.S.A.
CONTACT FACTORY DIRECT FOR PRICE AND DELIVERY
or See Your Dealer

District Shop Has Set High Standard

Modern Repair Shop at Headquarters Services Heavy Equipment Doing Highway Maintenance

C. & E. M. Photos

At left is a general view of the office buildings of the New Mexico Highway Commission district headquarters at Roswell. At right, a portable truck-mounted service unit greases and fuels a dump truck out on one of the district maintenance jobs.

✦ BUILT by the Works Progress Administration in the late 1930's, the buildings of the New Mexico Highway Commission district headquarters at Roswell have set a standard, since copied in four other districts in the state. The most important of these buildings from the standpoint of maintenance men is the big 60 x 100-foot equipment-repair shed.

This building is warmed in winter by an oil-burning furnace. Heat is put out through a system of Bryant blowers, and the mechanics and the stock-room clerk work in comfort. The building has a main heavy-equipment repair department, a parts-storage stock room, a tire shop, and a shower and clothing change room.

Work Pits

The heavy-equipment repair shop is so arranged that a motor grader or tractor can come in over a work pit in the floor, and be serviced from underneath as well as on top. Yale spur-geared hoists lift out engines or other parts.

The pits were built into the floor because of the danger and inconvenience to mechanics working under a machine hanging on a chain, or supported by a jack. The pits are well illuminated by fixed lights and they have drop cords ready to hook up.

Good Equipment Upkeep

All major repairs and overhaul jobs are done under the supervision of Shop Foreman E. L. Clayton. Special tools have been made to do odd jobs. New camshaft bearings can be installed in any engine they have, with the aid of guides turned down on a lathe exactly for that purpose. The installation of new camshaft bearings brings oil pressure back where it should be.

Automotive and construction equipment is kept up remarkably well. Three pick-up trucks in the yard seemed to be quite new. It turned out that one had 63,000 miles, one had 75,000, and the third had nearly 100,000 miles on its speedometer. All were undented, freshly painted, and their engines were in excellent condition.

The mechanics who keep equipment in this top-flight state are frequently called upon to go out and fight snow or do a host of other maintenance jobs. Wherever possible small repairs are made in the field by a traveling mechanic, who loads whatever tools and parts he needs into his pick-up truck and drives out to the broken-down rig. He stays with the job until it is finished.

In the winter, when much of the summer patching equipment is idle, it is overhauled and made ready for the next tough construction season. Equipment in good shape is stored in a

(Concluded on next page)

EAGLE
MODEL 400
LOADER

LOWER YOUR LOADING COSTS

A truly modern loader that incorporates the latest and best ideas in design, function and control. Conveyorized discharge chute permits lower overhead clearance, (11' 9") and speedier handling of material.

IT DOES THIS — Gets from job to job at truck speed. Handles any loose material quickly and economically.

WITH THESE—One man operation ● Hydraulic control ● Capacity—3 to 5 cu. yds. per minute ● Positive chain crowd ● Mounts on any standard 1½ or 2 ton truck chassis ● Self feeding augers feed material constantly, efficiently, into 20" buckets.

Write for further information and name of your distributor

EAGLE
JAW CRUSHERS • IMPACT BREAKERS
PULVERIZERS • CONVEYORS • LOADERS
CRUSHER CO., Inc.
GALION OHIO·U·S·A

JACKSON
MUNICIPAL PAVING UNIT

Knocks the Socks off PAVING COSTS!

This revolutionary new development in Municipal Paving Units has definitely proved that it can place perfectly upwards of **65 cubic yards of concrete in a single hour!**

FURTHERMORE, IT EMPLOYS THE ONLY SCREED THAT WILL:

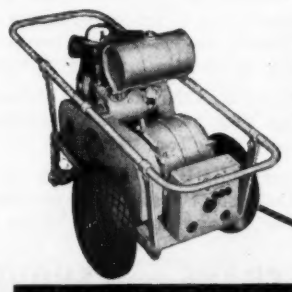
1. Undercut at side forms,
2. Roll back for second pass.
3. Strike-off crowns, both regular and inverted.
4. Permit operators to work from front, rear or sides.

In addition, the screed has such a strong tendency to propel itself in the forward direction that only small effort is necessary to strike-off stiff mixes of concrete. Manholes and storm sewers are no handicap due to the fact the screed does not reciprocate. Does an excellent job of vibrating concrete in slab depths up to 10 inches. Can be used to great advantage on any slab width from 6' on up to any practicable width. For radically reduced costs and far greater production, by all means write for complete details of this remarkable paving unit RIGHT NOW!

The COMPLETE UNIT CONSISTS OF:

1 The Model SC200 Screed (for slabs up to 16' wide) or Model SC202 (for slab widths from 16' and up) — activated by the famous JACKSON Vibratory motor. Light weight, easily transported — quickly converted from one slab width to another.

2 One of our famous Portable Power Plants which provide a wide range of vibratory frequencies, thus assuring perfect placement of any concrete mix usually specified. These husky plants are Wisconsin engine powered and have permanent magnet generators which require no adjustment or maintenance.



MODEL M-1 POWER PLANT

furnished with Model SC200 Screed. Capacity: 1.25 K.V.A. Generates both single phase and 3-phase 110 Volt 60 Cycle AC. Also ideal for operating lights, vibrators and powers tools.

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON MICHIGAN

C. & E. M. Photo

Orderly numbered bins in the District Shop storage stock room at Roswell, N. Mex., keep the parts straight. Mechanics sign for whatever they check out.

equipment yard about a mile from headquarters, while equipment in transit or ready for overhaul is brought in to the Roswell yard. There is a wide storage space about 100 x 250 feet between the repair shop and the district headquarters office building.

Shop Equipment

Each mechanic employed in the shop has his own hand tools, and the shop has been equipped with the following machines:

1 Chicago rivet machine
1 Manley hydraulic press
1 Bear wheel-aligner set
1 Willard battery charger
1 Yale triple-geared block on a LeTourneau crane
1 drill press
1 Black & Decker grinder
1 South Bend 6-inch lathe
1 Albertson valve refacer
1 Van Dorn valve refacer
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Slurry pumps which feature wearing parts made of an abrasion-resistant alloy are described in a catalog issued by the Pettibone Mulliken Corp., 4710 W. Division St., Chicago 51, Ill. This 16-page catalog describes in detail the centrifugal method employed by Pettibone Mulliken in making its castings. It also describes the characteristics of PMCO Diamond alloy, said to withstand abrasion and corrosion and to give harder, longer-wearing parts.

The bulletin contains six pages of charts and tables of engineering, technical, and design data. These include: a centrifugal-pump selection chart for determining size of discharge opening, theoretical hp, theoretical brake hp, and brake hp required at pump shaft; a list of standard slurry pumps carried in stock; a table giving pipe friction with various-size pipes according to gpm being delivered, velocity head, and velocity head loss; number of gallons per minute required to deliver one ton of dry rock per hour; specific gravity of solutions carrying different ratios by weight of rock and water; theoretical hp required to raise cold water to a particular head in feet; and theoretical effects of changing speed of a centrifugal pump.

The catalog contains a complete detailed description of dimensions, assembly drawings, and parts lists for the entire line of PMCO pumps and parts.

Copies of this literature may be obtained from the company. Or use the enclosed Request Card. Circle No. 82.

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The appointment of Roger G. DeLong as Manager of its Hydraulic Division has been announced by the Twin Disc Clutch Co., of Rockford, Ill., and Racine, Wis. At the same time, Wilton B. (Bill) Gibson has been named Sales Manager.

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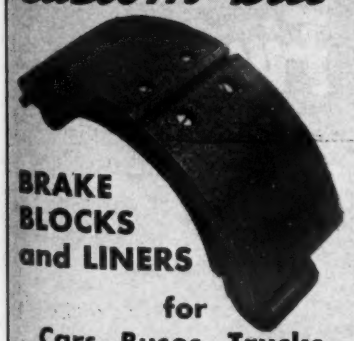

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Trees on the Roadside; Their Place and Care

Judicious Removal of Trees And Shrubs an Important Part of Roadside Program For Safety, Economy, Beauty

By NELSON M. WELLS, Principal Landscape Engineer, New York State Department of Public Works

Informing the Public

This article by Mr. Wells on a significant phase of New York State's roadside development was prepared for and sent out to garden clubs and editors of farm and garden papers as part of the Department of Public Works' public information program.

It is not only an excellent example of one way to gain support for a highway program by means of an informed public; it is also a concise outline of part of a roadside program planned for safety and economy as well as appearance. For this reason we believe that many of our readers will find it informative and helpful.

✦ THE design, construction, and maintenance of a modern highway involves problems never encountered in the horse-and-buggy days. One of these is the planting and management of roadside vegetation.

In the past, roadsides have probably received less serious attention than any of the construction phases of a highway; nevertheless they have considerable bearing on the safety and pleasure of the motoring public. They also have real significance to every taxpayer whose money is being invested in new highway work and the upkeep along the sides of existing highways.

During the past 15 or 20 years a growing interest has developed in roadsides. Today they are becoming properly recognized as an integral part of the complete highway. They comprise roughly from a quarter to a half of the area of the highway right-of-way and bear a close relationship to the design and functioning of the pavement itself. The cost of taking care of these areas outside of the pavement totals a fair percentage of all the maintenance involved. And the control of roadside vegetation accounts for a big share of this program.

The growth of plants along highways is of interest to many people. It is of interest to the abutting property owner and most residents of the state, because highways are an intimate part of the countryside through which they pass. It is of interest to the motorist, for it lies immediately adjacent to his traveled way. It is of interest to the governmental agencies responsible for the development and care of the safety, aesthetic, and economic factors involved.

Because of this general interest and the fact that vegetation as a part of roadside development should be analyzed and managed on the same progressive basis as the more strictly engineering features of the modern highway, it deserves broader understanding and the cooperative efforts of all concerned.

New York State is naturally covered by an aggressive forest growth. The use of land for farms means a constant onslaught on woods to keep them from springing up and intruding upon the clearings. Even on a highway right-of-way the annual grubbing out of shrubs and young trees is a costly operation.

In times past, the land on which a highway was laid was acquired by several methods. A large proportion of the present New York State highway network is on land acquired by the counties. Sometimes this strip of land is so narrow that plant growth along the property lines is very close to the pavement itself. The fence lines grow quickly from natural seedings and, left alone, have been largely responsible for the rows of maples, elms, oaks, and ash which line the traveled ways.

Trees as Troublemakers

Many of these trees and the hedgerows from which they spring are troublemakers. Some of them shade the pavement and cause icy conditions. Others act as snow traps and cause drifts which have to be plowed out repeatedly. Many screen some of our finest landscape scenery from the highway. But perhaps most important are the plants which constitute traffic hazards.

New York now permits a speed of 50 miles an hour on most sections of the state highway system, and it is possible that greater speed may be authorized at some time in the future. Increased speeds demand improved factors of driving safety, and one of these important factors is a roadside on which plant growth is properly related to the pavement.

Just how far back from the edge of the pavement it is safe to have tree trunks or even shrubby growth is a difficult point to determine. Traveling at a speed of 15 miles an hour or less a driver feels safe in passing a tree trunk 3 or 4 feet away. As the speed increases, he naturally veers away from any obstacle and uses more than his share of the pavement. This not only reduces the effective capacity of the highway but causes a hazard for others. The distance from the pavement which should be kept free from

(*Continued on next page*)

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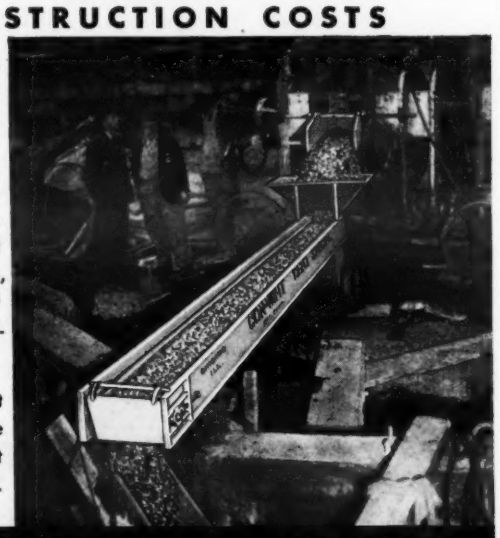

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all obstacles for average safety will thus be found to be in direct ratio to the designed speed on the highway.

The first restricted areas, of course, are the road shoulders. On the downhill side of a highway which is built on filled ground, the distance between the edge of the pavement and physical obstacles should be the width of the shoulder plus at least 2 to 5 feet. On cut slopes the drainage way must be kept free for the sake of an uninterrupted flow of water. Here the distance should be the shoulder width plus the width of the ditch; and for higher speeds, perhaps an added unit of another 2 to 5 feet should be provided.

On reasonably level sections which are neither cuts nor fills, the clearances should be substantially the same and defined according to the permitted speed on that particular section of the highway. When such safe distances are checked in the field, it will be found that there are many trees within the danger zone.

So far these limits of clearance relate to straight alignments of highway. Of greater importance is the relationship between the pavement and unobstructed areas on curves and at intersections. Safe negotiation of curves requires clear vision between the traveling car and some point on the highway ahead of the vehicle; the point should include the distance traveled while the driver becomes aware of the situation, plus the time and distance necessary for him to stop his car before colliding. Obviously, trees or shrubs which obscure this safe sight distance are out of place. No new plantings should be added in such areas, and existing growth should properly be removed. First and last, a great deal of vegetation exists in this critical relationship, and present roadside maintenance programs are progressing towards its removal as a safety provision.

Furthermore, it will be found that many roadside trees are in a weakened condition due to age or disease, so that branches or even whole trunks may fall upon the highway and cause accidents. New York State is now taking all necessary steps to eliminate such hazardous trees from the highway right-of-ways.

Also many trees in this category are outside the highway right-of-ways. Still others are on the right-of-ways where owners of the abutting property claim certain rights or interests that are in opposition to the benefits of the traveling public. It now becomes a problem of educating the public to the hazard presented by such trees. As this hazard becomes thoroughly understood, no public-spirited citizen should place the subjective value of a tree, no matter how beautiful in itself or how much sentiment is attached to it, above a human life, a maimed body, or even a wrecked car.

Often an interested property owner thought only of shade. He may have set out a row of maple saplings some 6 to 20 feet apart along the property line. Today they are 75 years old. Their crowns are intertwined. If alternate trees had been removed from time to time they would now stand 60 to 80 feet apart and each tree would be a beautiful specimen. The existing condition, however, is a taxpayer's burden in caring for two or three times as many trees as are desired or necessary. Furthermore, each tree may be full of dead wood that was shaded out by too-close growth.

Add another criterion to this expanding list of objectionable qualities of roadside vegetation—that of appearance. How often the hedgerow, the row of natural trees, or the trees which some sincere nature lover planted and cared for, are preventing the traveler on the highway from looking across the lake or stream, out across the pasture where the livestock are grazing, or to the richly forested hilltops. These are landscape values at a distance from the highway which can be comprehended and appreciated by the motorist. They comprise the variety and interest of New York's rural scenery and should be revealed and accentuated.

If roadside growth is judiciously retained or encouraged, or even planted where it screens objectionable or uninteresting views; if clearings are made where they partially or entirely enframe the best vistas, and real clearings are created where the large open spaces exist, the roadside landscape will be on a scale which is geared to highway speeds and will take advantage of the scenic assets of the state.

Judicious Removal

Beyond question some of the finest landscape compositions can be created by the axe and the brush hook. This is not a new idea nor one which has grown up in connection with roadsides. It is a basic landscape principle advocated by such authorities as Humphrey Repton and William Gilpin in the 19th century and re-emphasized in modern generations by Andrew Jackson Downing, the Senior Frederick Law Olmsted, Dr. Charles Sprague Sargent, and many others whose opinions on landscape design are known and revered. The judicious use of the axe in the removal and management of natural growth is agreed to be far more effective and, incidentally, more economical than most artificial plantations in the broader landscape compositions.

Philip Gilbert Hamilton wrote in the latter part of the last century: "The mere act of removing certain trees from a natural forest and leaving others standing is a fine art, if done with a view to beauty, although human interference, in this instance, adds nothing whatever that is tangible or material.

(Continued on next page)

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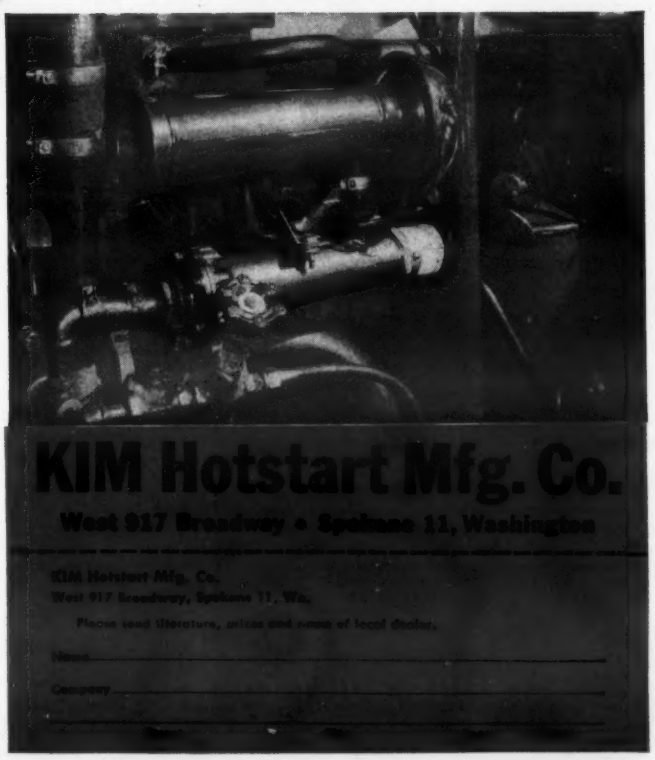
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Trees on the Roadside; Their Place and Care

(Continued from preceding page)

It only adds beauty, or reveals beauty, by taking away the impediments that prevented it from being seen. Among the recognized fine arts there are two that consist *entirely* in removal. In sculpture and mezzotint no grain of marble dust or copper powder is added to the work; the artist does nothing but take away matter, at first in large quantities, and then in smaller and smaller quantities as his work approaches completion. The work of clearing in a wood is analogous to these arts, when carried out with an artistic intention only."

An old planting adage is pertinent also: "Plant thick—thin quick". Fine outstanding trees are rare on the home grounds and parks of America because this principle has been neglected. There is too much false sentiment about saving individual trees which in themselves are actually weeds interfering with the growth of better trees. A well conceived plan looking towards beauty and interest on a broad scale will boldly destroy many impediments along the way to attain a studied management and preserve truly noble trees having a recognized landscape value.

Miscellaneous growth on embankments may be managed in much the same manner. It grew from natural seedings and may contain a mixture of grasses, weeds, vines, shrubs, and trees. Each such situation needs to be analyzed on its own merits. Perhaps grass alone would make a satisfactory and reasonably permanent cover. In such a case some chemical spray may be used which will totally kill everything but the grass. The grass can then be fertilized and encouraged to spread and fill in the voids; henceforth it is only a mowing maintenance chore.

In another situation where the slope is too steep for power mowers, it may be appropriate to have a low cover of New Jersey tea, sweet fern, shrubby willows, low blueberry, Canada yew, or any one of many desirable low-growing colony-forming native plants which would be satisfactory if they constituted more nearly 100 per cent cover. This case would involve the grubbing out or poisoning of all undesirable kinds, such as poison ivy or seedling trees, to reduce the competition and thus encourage the desirable growth. This principle of selective management is used in forestry practice and is equally applicable to lower-growing shrubs and vegetation.

Purpose of Plantings

New plantings are a part of this program and their disposition may serve a utilitarian purpose embracing the same principles. For example, new plantings as well as selected native growth can augment safety precautionary measures. They can delineate curves, they can aid in directing traffic into diverging lanes, they can create interest and alleviate monotony, they can be so selected and placed that they serve to reduce speed where that is desirable.

Beyond all these are the general landscape qualities of alternate open and shaded tracts, pleasant shade at wayside stopping areas, screens for unsightly views and service areas, and harmonious plantings in combination with bridges and other highway structures. In a more general way, the effects of woody vegetation are desirable for blending the man-made highway into its natural environment for the pleasure and interest of the traveling public.

It might be thought that trees and shrubs have no place along highways and that it is planned to destroy all that can be reached. This is not the case. Present planning accounts for removal of only what is considered hazardous or superfluous. Even if a removal program were comprehended and advocated by every thinking person; even if one weighed his good judgement on what is safe, economical, and attractive against his inherent love for green growing plants and then willingly agreed to it; even with all this, a wholesale removal program probably never could be accomplished 100 per cent under current working conditions.

But let judicious removal be an objective. Granted that the reasons are sound, it may be a guiding policy in roadside development and maintenance work. When we come upon a rich hedgerow, a row of trees, or a miscellaneous roadside growth, these are the questions which must be answered: Does it comprise a safety hazard? Does it pocket snow on the highway? Does it screen a desirable view? Would one or two trees or one or two clumps of shrubs be just as effective as the larger mass? Are they the kinds of trees that are long-lived and relatively free from pests? Are they strong-limbed to withstand storms? Are they beautiful in branching habit, flower colors, fruits, or seasonal color?

If not, then they should be on the program for removal so that all available resources may be devoted to the feeding, pruning, bracing, cabling, spraying, and all the care that deserving trees require. Just as landscape development is usually the last consideration in building a home, so it is when funds are scarce for public works. The

(Concluded on next page)

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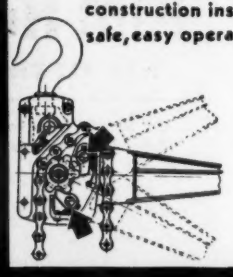

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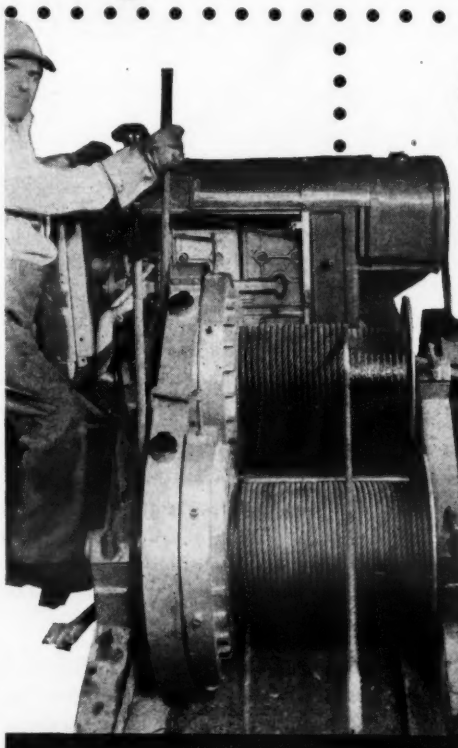

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pavements and structures will probably be maintained before the roadsides, and the smaller the burden the better chance there will be that really worthwhile shrubs and trees will be well cared for.

Planning the Complete Highway

Planning roadsides as an integral part of the modern highway is coming into the scheme of development. The addition and management of vegetation is part of this program. The removal of undesirable growth is already under way. Some owners of trees will be asked to forego their personal sentiments for the benefit of the traveling public. It will be a long-term project, based on an overall working plan and broad vision. It is essentially a magnification of the scale of the home grounds or the county park to a landscape development on a state-wide basis, wherein the intrinsic values of the larger aspects of the countryside are of greater significance than details which may be seen only from a standing position. It should be carried out gradually over a period of years through the collaborative endeavors of many interested persons.

Residents of the state need not be uninformed on the reasons behind this work, for a fortunate situation exists. There is an ever-increasing number of organizations of nature lovers and garden lovers. Every city and hamlet has its garden club or garden committee of some civic organization. These people are interested in the preservation of our natural resources, including scenic resources. They are the thinking and planning groups on problems affecting broad-scale horticultural matters. Such organizations started out some 25 years ago, primarily interested in flower arrangements and social gatherings. Today they represent the men and women with horticultural vision. Their interests are approaching the plane of horticultural societies, botanical gardens, and scientific plant research.

The program of planning and managing woody growth on the highway right-of-way and the lands adjacent to it deserves their cooperative effort. They, as public-minded citizens of the State of New York, with the Department of Public Works which represents this citizenry in creating finer highways, can together promote an overall plan; first from the standpoint of safety, second from the standpoint of taxpayers' economy, and last but not least the enhancement of the natural beauty of our roadsides.

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The last thirty pages contain a series of questions and answers. The answers are listed separately, so that the text can be used for self-examination.

This book is available to readers of CONTRACTORS AND ENGINEERS MONTHLY at a price of 50 cents per copy anywhere in the United States; elsewhere, 75 cents. Write direct to the Lincoln Electric Co., and mention this review.

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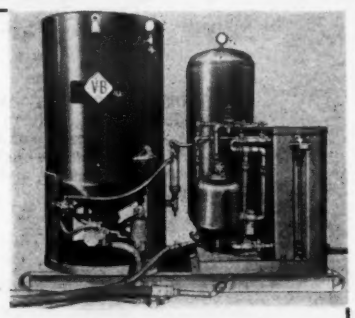

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These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Contract Sets No Time Limit; Implies Promptness

THE PROBLEM: *An engineering company contracted to furnish a road-building machine and crew to spread aggregate on an Army air-base project. The specifications required that the machine have the capacity to spread at least 150 tons per hour. The Government agreed to furnish the necessary aggregate placed in windrows, to deliver the bituminous paving materials alongside the machine, and to attend to rolling and compacting operations. The machine was not removable prior to final release except as authorized by the Government's representative. No time for completion of the contract was specified.*

What were the Government's obligations as to promptness in furnishing the materials essential to performance of the company's contract? Could the contractor recover for loss sustained as a result of delay?

THE ANSWER: No. (Northwestern Engineering Co. v. United States, 154 Fed. 2d 793, decided by the United States Circuit Court of Appeals, Eighth Circuit, and affirming a decision of the United States District Court for South Dakota.)

"Under this contract plaintiff [the contractor] could not recover for loss sustained as a result of delay in absence of arbitrary and inexcusable failure or neglect on the part of defendant [the Government]. The defendant, in agreeing to furnish the aggregate and in requiring a machine having the capacity to mix and spread a minimum of 150 tons per hour, was under the implied obligation to proceed with the work with reasonable diligence. . . . In the present case there was an implied condition that defendant would not delay plaintiff in the performance of the work. . . . But time was not declared to be of the essence, and defendant's duty to furnish sufficient material was not an absolute one. The court has no power to make a new and different contract for the parties."

Accidents on Roads Under Construction

THE PROBLEM: *As a farmer's combine was being towed by a tractor over a highway under construction, there was a collision with a tractor-towed roller operated by the contractor's employee. Was the highway contractor liable for damage?*

THE ANSWER: Yes, said the Nebraska Supreme Court. (Fahrenbruch v. Peter Kiewit Sons' Co., 27 N. W. 2d 680.) The road was being used necessarily, and with the contractor's permission, by the farmer, who lived near the construction site. The court decided that a jury was justified in finding the contractor's employee at fault for the accident, under the facts of the case.

It applied this general rule of law: "that where a highway under construction or repair is being used permissively in a limited manner by adjacent residents, it must be kept and maintained by the contractor in a reasonably safe condition for the use of those driving thereon, who are at the same time required to exercise reasonable care under the peculiar circumstances and conditions confronting them by keeping a constant lookout and vigilant caution for obstructions incident to the progress and completion of the work."

It Was Up to Excavator To Explore Site for Rock

THE PROBLEM: *Specifications for a municipal waterworks pre-settling basin required bidders to satisfy themselves as to the nature and conditions of the location. Were the excavating contractors entitled to recover damages or extra pay when a layer of rock shown on the plans proved to be nonexistent, and so entailed extra expense?*

THE ANSWER: No, said the United States District Court, Eastern District of Wisconsin (Furton v. City of Menasha, 71 Fed. Supp. 568.)

The work involved a 7-foot excavation of an area 724½ x 732 x 150 x 1000 feet. Rock was indicated on the plans as incidental to the erection of foundations for baffle walls, headhouse, and dykes. The contractors relied upon the plans as showing a floor of rock at uniform level under the area to be excavated; this would permit use of certain machinery, trucks, and equipment. After considerable work had been done, non-existence of the rock base was discovered, and heavier equipment as well as the construction of supports for it became necessary.

The vital clause of the bidding spex read: "Bidders must satisfy themselves, by personal examination of location of the proposed work, and by such other means as they may prefer, as to the actual conditions and requirements of the work, and shall not at any time after submission of a bid dispute, complain, or assert any misunderstanding in regard to the nature or amount of the work to be done."

After stressing that the contractors had had wide experience in excavating, the court said, in part: "They made no inquiry of the engineer before signing the contract as to whether he had made any borings in the basin area. They had full opportunity to determine conditions for themselves and they were required to do so. . . . They warranted by their contract that they had done so when they submitted their bid. . . . Their investigation may or may not have been adequate. They, however, assumed that risk. . . . The plaintiffs assumed the responsibility of meeting whatever conditions might arise.

"If plaintiffs deemed such a base essential . . . for the performance of their contract,

(Concluded on next page)

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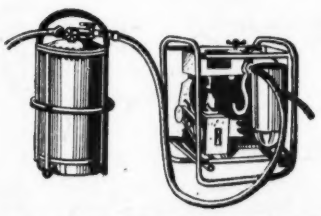

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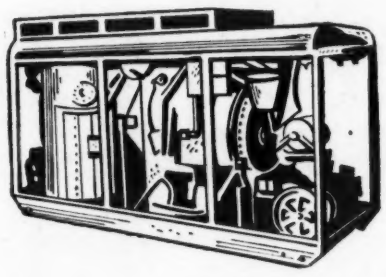

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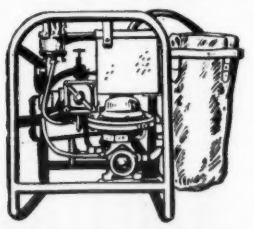

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Avoid Legal Pitfalls

(Continued from preceding page)

then it was their duty to explore that region carefully by boring and probing throughout the area, which they failed to do. They had no right to assume from the plans that a solid ledge of rock existed at a uniform level over the entire area at an elevation of 812+. Defendant made no such representation to them. . . . The notation of 'rock' on the plans cannot be construed as anything but 'rock' and certainly not as a warranty or representation that a solid level rock base existed at a depth indicated on the plans by the word 'rock'. There was no positive or wilful misrepresentation made by the defendant or its engineer as claimed by plaintiffs, and they cannot now be heard to plead misunderstanding or deception."

Accordingly, the court dismissed the contractors' suit to recover more than $100,000 claimed to represent the unexpected expense to which they were put.

Failure to Read Document Does Not Excuse a Party

THE PROBLEM: *A contractor's representative made a compromise agreement with a subcontractor. Later he attempted to avoid the effect of it on the ground that he approved the agreement without reading it? Was he justified?*

THE ANSWER: No, ruled the United States District Court, Northern District of West Virginia. (Haddad v. Western Contracting Corp., 71 Fed. Supp. 212.) The court applied the elementary legal principle that one cannot escape the consequences of having assented to the terms of a document merely because he did not read it.

A comment should be made here, however. This decision does not mean that failure to read a document prevents one from repudiating its provisions (1) if he has been fraudulently prevented by the other party from informing himself as to the contents of the document, or (2) if through *mutual* mistake, the document fails to express the true intent of the parties.

Paving Bid Disqualified

THE PROBLEM: *Could a municipal board lawfully reject a paving bid for failure to comply with a bidding specification which required a statement as to the asphalt-mixing-plant facilities available to the bidder?*

THE ANSWER: Yes, said the New Jersey Supreme Court. (Kingston Bituminous Products Co. v. Board of Commissioners, City of Trenton, 48 Atl. 2d 197.) The judge said that he should not interfere in the operation of the city's affairs by invalidating the specification, "in view of the admitted fact that it is necessary, in order to obtain a durable pavement, that the asphalt be laid at a high temperature."

Meaning of "Overburden"

THE PROBLEM: *By reference to the terms of a general dam-construction contract, subcontractors became bound to remove "overburden" in quarrying rock. There was no definition of overburden. Were the subcontractors entitled to produce testimony tending to show that the commonly accepted meaning of the term excluded certain classes of stone not to be quarried for the contract purpose, making aggregate?*

THE ANSWER: No. (Jackson Materials Co. v. Grand River Dam Authority, 170 Pac. 2d 552, decided by the Oklahoma Supreme Court.)

The court decided, in substance, that the meaning of trade terms of a technical nature may be explained when their meaning is in doubt. But under the guise of making such explanation, the meaning of a term may not be so distorted as to make the contract mean what the parties did not intend that it mean. The court added: "The word 'overburden' when used in connection with rock quarries, has a well recognized meaning defined in 'Webster's Unabridged Dictionary' as 'waste overlying a deposit of quarry stone'. Evidently the plain, ordinary meaning of the word was intended; from the plain wording of the contract this waste was not to be classified."

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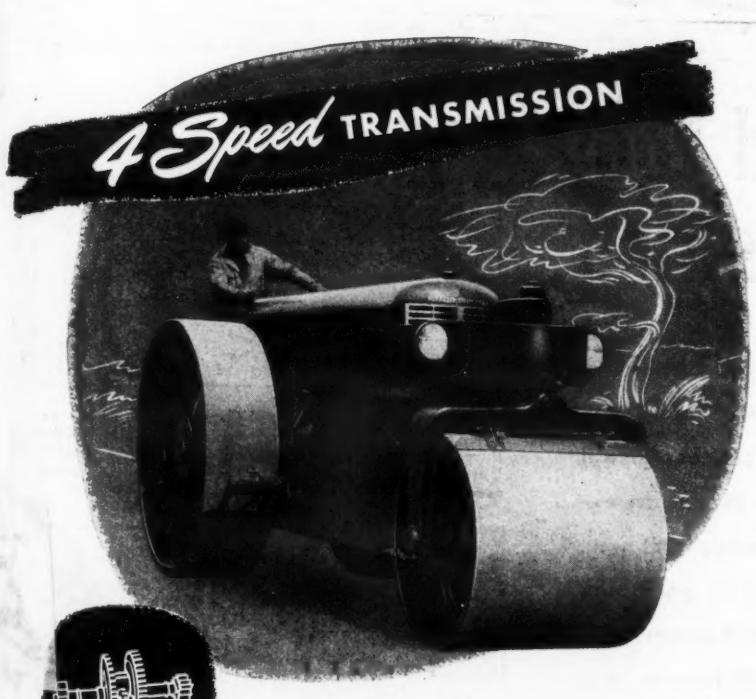

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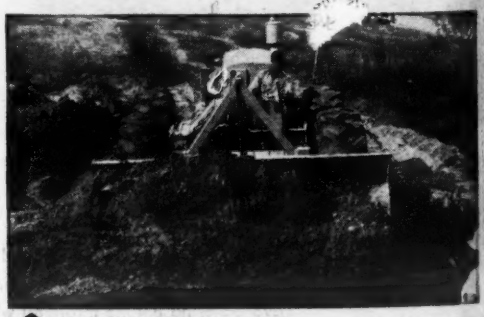

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